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CONTENTS

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Encyrtoscelio Dodd (Hymenoptera: Platygastridae) From India

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ABSTRACT: Members of Genus *Encyrtoscelio* Dodd are rather relatively small with a limited distribution globally. They can be easily identified from other genera by the unique shape of the head, with a frontal ledge protruding between the eyes. The genus is not common in collections. Taxonomic studies on a small sample size of *Encyrtoscelio* collected from different parts of India revealed a total of 6 species, of which four species, *E. circumeo* sp.nov., *E. latus* sp.nov., *E. malabarensis* sp. nov. and *E. nigrum* sp.nov. are new to science, while *E. mediterraneus* Caleca and *E. mirissimus* Dodd form the first reports from India. The goal of this paper is to provide adequate clarity to species concepts of Indian *Encyrtoscelio.* All of the species are illustrated, and a key to species is included.

KEYWORDS: Hymenoptera, Platygastridae, new species, Scelioninae, India

INTRODUCTION

The genus *Encyrtoscelio* belonging to the tribe Gryonini (Scelioninae: Platygastridae), was erected by A. P. Dodd in 1914 based on the type species *Encyrtoscelio mirissimus* Dodd. Szelenyi (1941), Waterston (1927), Galloway & Austin (1984), Le (2000) reported the genus from different parts of the world. A total of 12 species are known globally in the genus (Johnson, 1992, 2014). Only one species, *Encyrtoscelio apterus* (Szelenyi) has been reported from India (Caleca and Bin, 1995).

Encyrtoscelio can be easily identified from the rest of Scelioninae by a set of distinct characters- head and body often with coriaceous sculpture, a transverse, arched and carinate frontal ledge projecting forward between the eyes (Fig. 4), subtriangular head in lateral view (Fig.10)

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much elongated beak-like protruded mandibles (Fig.18). Pronotum rugose; mesopleura transversely carinate and foveolate anteriorly and rugose posteriorly; netrion absent; metapleuron rugose throughout, not hairy. Uupcurved marginal cilia towards the posterior apical margin of the forewings (Fig.6) in macropterous females. The majority of females and all males are micropterous. Both micropterous and macropterous females are found in the same species (Caleca & Bin, 1995).

Data on hosts and biology of these egg parasitoids are scanty. However Caleca & Bin 1995, reports from France *Cydnus aterrimus* Förster (Heteroptera: Cydnidae) as the host of *Encyrtoscelio cydni* Caleca. Le (1986, 2000) described three species from Vietnam, however the species cannot be identified accurately based on the descriptions. The institute of Hanoi is not willing to mail their specimens and the authors are not in a position to visit Hanoi to personally examine them.

So just as Johnson 1996 in his world revision of *Paratelenomus* found characters in Le 1986 insufficient to distinguish taxa, the three Vietnamese species, *Encyrtoscelio maro* Kozlov & Le, *Encyrtoscelio odorata* Kozlov & Le and *Encyrtoscelio minatoris* Kozlov & Le are here by categorised as status unknown. This paper presents the species concepts of Indian *Encyrtoscelio* with adequate clarity.

MATERIALS AND METHODS

The present study is based on specimens collected through Malaise Trap, Yellow Pan Trap, Pit Fall Trap and Sweep Net from various localities in India. Specimens were studied under a Leica M 205A stereomicroscope. Images were taken using Leica DFC 500 camera and processed using extended focus montage LAS software. The holotypes and other material examined are deposited at the Western Ghat Regional Centre, Zoological Survey of India, Kozhikode, Kerala (ZSI, WGRC). Terminology followed is based on Miko *et al.*, 2007 and (Caleca & Bin, 1995).

ABBREVIATIONS

A1- A12- Antennal segments; EDM- Maximum eye diameter; EOD- Minimum eye-occiput distance; HL- Head length; HW- Head width; L- Length; M- Marginal; MW- Mesosoma width; ML- Mesosoma length; OOL- Ocellocular length; OD- Ocellar diameter; PM- Post marginal vein; POL- Posterior ocellar length; STG- Stigmal vein; T1- T2-Tergites of metasoma; W- Width.

RESULTS AND DISCUSSION

Key to species of the Genus *Encyrtoscelio* Dodd from India (Females)

1) Mandibular shaft without inner tooth; but with two spurs (Fig. 22) on longitudinal ridges.....2

-. Mandibular shaft with inner tooth (Fig. 23), spurs absent…….....……..……4

2) Head width/ length in dorsal view < 1.8; width/ length of frontal ledge <2.5……..3

-. Head width/ length in dorsal view > 1.8; width/ length of frontal ledge >2.8……*E. latus* sp. nov.

3) Width/ length of frontal ledge= 2.1; EDM/EOD= 2.5; head width/ length in dorsal view= 1.5……*E. apterus* (Szelenyi)

-. Width/ length of frontal ledge= 2; EDM/EOD= 6; head width/ length in dorsal view= 1.5…*E. malabarensis* sp. nov.

4) EDM/ EOD < 5.5; head width/ length in dorsal view < 1.4……5

-. EDM/ EOD > 5.8; head width/ length in dorsal view >1.6…….6

5) Width/ length of frontal ledge= 1.6; EDM/ EOD= 5.3……*E. mirissimus* Dodd

-. Width/ length of frontal ledge= 2.4; EDM/ EOD= 2.....*E. mediterraneus* Caleca

6) Eyes hairy (viewed in60x and above); width/ length of frontal ledge= 3.1..... ….. *E. nigrum* sp. nov.

-. Eyes bare (viewed even in 160x); width/ length of frontal ledge= 2.1… ……*E. circumeo* sp. nov.

Encyrtoscelio circumeo Abhilash & Rajmohana sp. nov.
urn:lsid:zoobank.org:act:7C398422-F0D1-41F3-AC20-C91845193300
(Figs.1- 4)

Holotype: ♀: Length= 0.98mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brownish black; mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellowish brown, coxae brownish black; eyes greyish; wings hyaline.

Head: In lateral view subtriangular; in dorsal view1.6x as wide as long (L= 0.29; W= 0.48), with fine hairy punctures; width/length of frontal ledge= 2.6x; frontal ledge wide, circular apically (Fig. 4); EDM/ EOD= (6.3x); POL: LOL: OOL= 20: 13: 7; eyes bare; frontal depression not deep; clypeus slender, protrudes from lower part of frons; with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth present (Fig. 23) behind median tooth on ventral side; mandibles very long, as long as scape; mandibular shaft without spurs on mandibular shaft; malar sulcus prominent;

occipital carina complete; antenna 12 segmented; clava five segmented (Fig. 3); claval sensillar formula 1,2,2,2,1.

Mesosoma: MW: ML= 47: 40, sculpturing (Fig. 2) same as that on head, with fine hairy punctures; mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1♀, INDIA, Hyderabad, Angrau, 13-xi-12, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3593).

Etymology: Species name is due to the circle shaped frontal ledge. '*Circumeo*' in Latin means 'Circle'.

Discussion: This new species keys to couplet no. 4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. mirissimus* Dodd in having 12 antennal segments, 5 claval antennomeres (Fig. 3), mandibular shaft with inner tooth and sensillar formula 1,2,2,2,1. But *E. circumeo* can be easily distinguished from *E. mirissimus* by having, a) EDM/ EOD= 6.3 (in *E. mirissimus* EDM/ EOD= 2.8); b) In dorsal view, frontal ledge circular based inverted 'U' shape (Fig. 4) (In dorsal view, frontal ledge wide based inverted 'U' shape in *E. mirissimus*).

Encyrtoscelio latus Rajmohana & Abhilash sp. nov.
urn:lsid:zoobank.org:act:AEFF113E-6679-4954-B8E7-DCF9D3B51897
(Figs.5- 9)

Holotype: ♀: Length= 1.2mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brownish black (Fig. 7); mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellowish brown, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 2x as wide as long (L= 0.28; W= 0.57), with fine hairy punctures; width/length of frontal ledge= 4.2; frontal ledge wide; EDM/ EOD= 7; POL: LOL: OOL= 23: 12: 9; eyes hairy (visible in higher magnification, 60x and above); frontal depression not deep; clypeus slender (Fig.8), protrudes from lower part of frons and with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth absent; mandibles very long, as long as scape;

mandibular shaft with two spurs (Fig. 22) on longitudinal ridges; malar sulcus prominent; occipital carina complete; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1.

Mesosoma: MW: ML= 53: 46, sculpturing same as that on head, with fine hairy punctures (Fig. 6); mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material examined: 1 ♀, INDIA, Meghalaya, Upper Shillong, 10-vi-13, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3594).

Etymology: Species is named because of the very wide frontal ledge. '*Latus*' in Latin means 'wide'.

Discussion: *E. latus* Rajmohana & Abhilash sp. nov. keys to couplet no.4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. apterus* (Szelenyi) in having 5 claval antennomeres, 1,2,2,2,1 sensillar formula (Fig. 9) and mandibular shaft without inner tooth. However it can be well separated from *E. apterus* in having the following characters: a) EDM/ EOD= 7 (in *E. apterus* EDM/ EOD= 2.5); b) width/ length of frontal ledge= 4.1 (in *E. apterus* width/ length of frontal ledge= 2.1); eyes hairy (in *E. apterus* eyes bare).

Encyrtoscelio malabarensis Abhilash & Rajmohana sp. nov.
urn:lsid:zoobank.org:act:A3ED19E9-A5B6-4ECF-862C-8D95078EDF79
(Figs.10- 14)

Holotype: ♀: Length= 1.1mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brown; mandibular shaft yellowish brown; teeth of mandible chestnut brown; legs brown yellow, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 1.5x as wide as long, with hairy punctures; width/length of frontal ledge= 2; frontal ledge slightly tapering forward (Fig. 14); EDM/ EOD= 6; POL: LOL: OOL= 20: 12: 6; eyes bare; frontal depression not deep, clypeus slender, protrudes from lower part of frons and with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth absent;

mandible very long (Fig. 10), as long as scape; mandibular shaft with two spurs on longitudinal ridges; malar sulcus prominent; occipital carina complete; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1 (Fig. 12).

Mesosoma: MW: ML= 43: 38, sculpturing same as that on head, with fine hairy punctures; mesoscutellum protruding beyond metascuteum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1 ♀, INDIA, Kerala, Malabar Wildlife Sanctuary, Kakkayam, Kozhikode District, 18-xii-13 Coll. Shweta. M (ZSI/WGRS/IR.INV.3595); Paratype: 1 Female, INDIA, Kerala, CPCRI, Kasargod District, 05-xii-12 Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3596); 1 Female, INDIA, Kerala, Thenmala, Kollam District, 07-i-14, Coll. Rajmohana. K (yellow pan) (ZSI/ WGRS/IR.INV.3597); 1 Female, INDIA, Karnataka, Lakhavalli, Bhadra WLS, 07-xi-06 Coll. Rajmohana. K (yellow pan) (ZSI/WGRS/IR.INV.3598).

Etymology: Named after, Malabar Wildlife Sanctuary, the locality from where the holotype was collected.

Discussion: This new species keys to couplet no. 4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. apterus* (Szelenyi) in having 5 claval antennomeres, mandibular shaft without inner tooth and 1,2,2,2,1 sensillar formula (Fig. 12). *E. malabarensis* Rajmohana & Abhilash sp. nov. can be easily distinguished from *E. apterus* (Szelenyi) in having, a) EDM/ EOD= 6 (in *E. apterus* EDM/ EOD= 2.5); b) In dorsal view, frontal ledge slightly tapering forward, inverted 'U' shape (In dorsal view, frontal ledge wide based inverted 'U' shape in *E. apterus*).

Encyrtoscelio mediterraneus Caleca
(Fig.20)

Diagnosis: Body reddish brown except mandibular shaft, A1- A7, and legs other than coxae being pale yellow; clava darker; head slightly pointed; antenna 12 segmented with claval segments 5; EDM/ EOD= 1.5; POL: LOL: OOL= 20: 13: 7; head width/ length= 1.3; width/ length of frontal ledge= 2.8; sensillar formula; 1, 2, 2, 2, 1; wings absent; mandibular shaft without spurs; inner tooth present on mandible; clypeus slender, the same shape as *E. mirssimus*; eyes bare.

Fig.1 Habitus

Fig.2 Dorsal profile

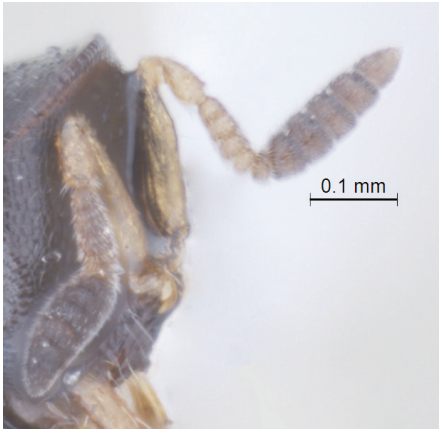

Fig.3 Antenna

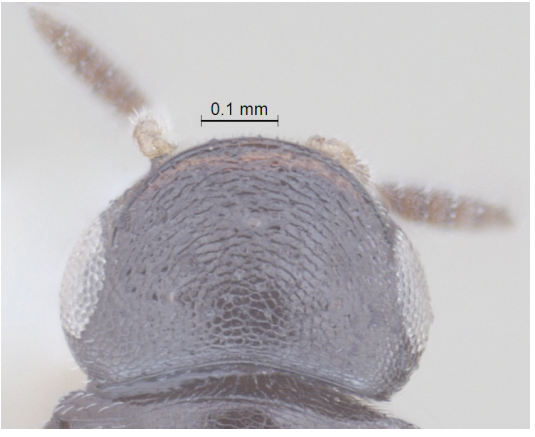

Fig.4 Head dorsal view

Figures 1-4: *Encyrtoscelio circumeo* Abhilash & Rajmohana sp. nov. (Female)

Fig. 5 Habitus

Fig. 6 Dorsal profile

Fig. 7 Antenna

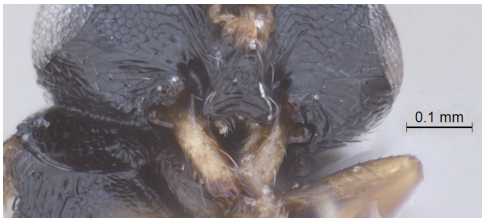

Fig. 8 Clypeus

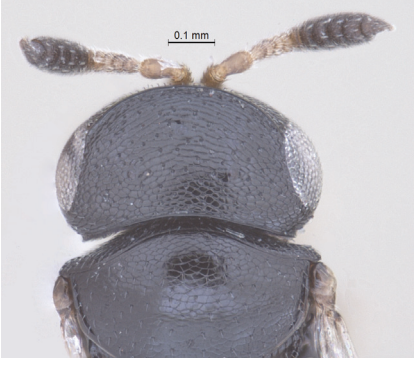

Fig. 9 Head dorsal view

Figures 5- 9 *Encyrtoscelio latus* Rajmohana & Abhilash sp. nov. (Female)

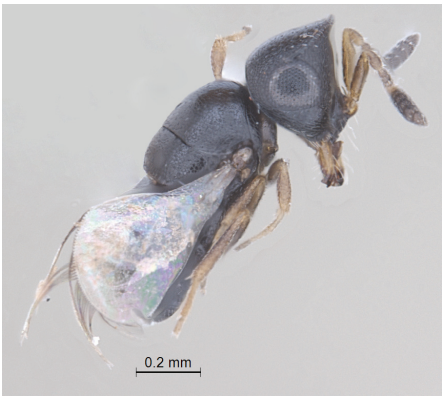

Fig. 10 Habitus

Fig. 11 Dorsal profile

Fig. 12 Antenna

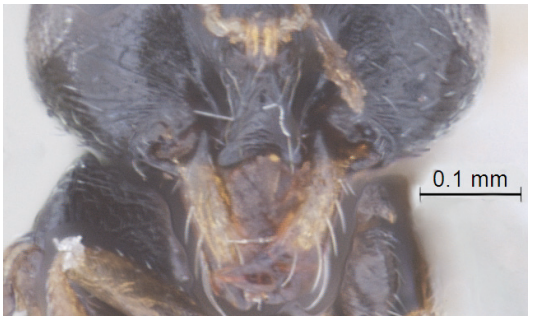

Fig. 13 Clypeus

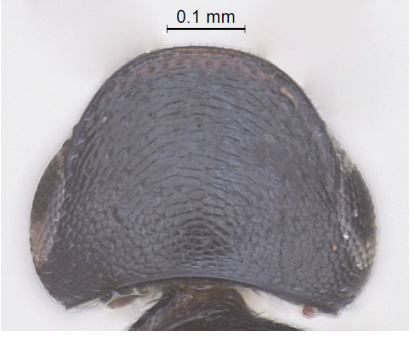

Fig. 14 Head dorsal view

Figures 10- 14 *Encyrtoscelio malabarensis* Abhilash & Rajmohana sp. nov. (Female)

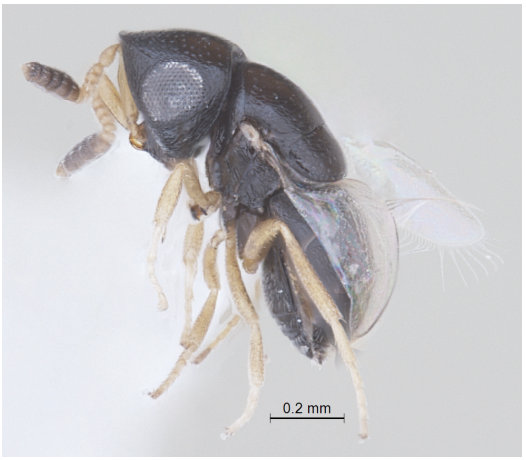

Fig. 15 Habitus

Fig. 16 Dorsal profile

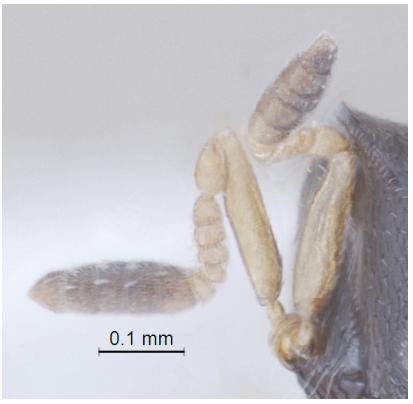

Fig. 17 Antenna

Fig. 18 Clypeus

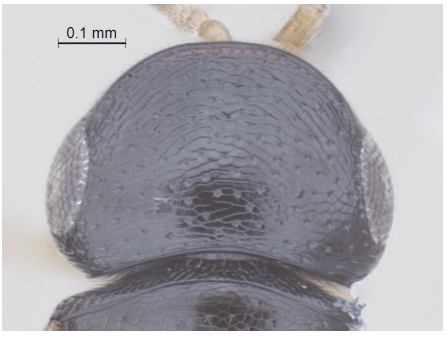

Fig.19 Head dorsal view

Figures 15- 19 *Encyrtoscelio nigrum* Rajmohana & Abhilash sp. nov. (Female)

Fig. 20 *Encyrtoscelio mediterraneus* Caleca Dorsal profile

Fig. 21 *Encyrtoscelio mirissimus* Dodd- Dorsal profile

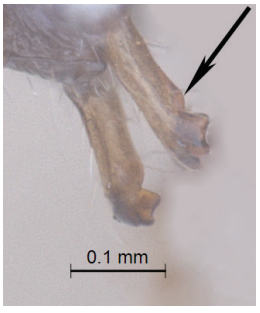

Fig. 22 Mandibular spur

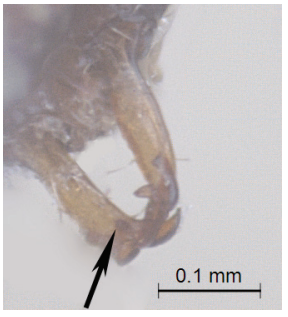

Fig. 23 Mandibular inner tooth

Material Examined: 1 ♀, INDIA, Karnataka, Nagarhole, 11-viii-01 Coll. P. A. Sinu (ZSI/WGRS/IR.INV.3599); 1 Female, INDIA, Kerala, CPCRI, Kasargod District, 06-12-12, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3600).

Discussion: *E. mediterrraneus* agrees to general description in Caleca & Bin, 1995 with slight variations in EDM/EOD, dorsal head width/ length and frontal ledge.

Encyrtoscelio mirissimus Dodd
(Fig.21)

Diagnosis: Body brown except mandibular teeth, A8- A12, and legs other than coxae pale yellow to yellow brown; antenna 12 segmented with claval segments 5; EDM/ EOD= 5.3; POL: LOL: OOL= 21: 12: 8; head width/ length= 1.3; width/ length of frontal ledge= 1.6; sensillar formula; 1, 2, 2, 2, 1; wings reduced (micropterous female, Fig. 21); mandibular shaft without spur; inner tooth present on mandible; clypeus slender with wrinkles on central part; eyes bare.

Material Examined: 1 Female, INDIA, Karnataka, Sringeri, Begur scrub forest, 23-iv-03 Coll. P. A. Sinu (ZSI/WGRS/IR.INV.3601)

Discussion: *E. mirissimus* agrees to general description in Caleca & Bin, 1995 with slight variations in EDM/EOD, dorsal head width/ length and frontal ledge.

Encyrtoscelio nigrum Rajmohana & Abhilash sp. nov.
urn:lsid:zoobank.org:act:AA011690-F7DA-4FAA-BFD9-DFEDB1846FE7
(Figs.15- 19)

Holotype: ♀: Length= 1.1mm.

Body black, except the following: A1- A7 yellowish brown, rest of antennal segments brown; mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellow, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 1.6x as wide as long, with fine hairy punctures; width/length of frontal ledge= 3; frontal ledge wide, flattened apically (Fig. 19); EDM/ EOD= 6.6; POL: LOL: OOL= 19: 12: 8; eyes hairy (visible in higher magnification, 60x and above); frontal depression not deep; clypeus slender, protrudes from lower part of frons and clypeus with wrinkles on central part (Fig. 18), anterolateral corners blunt and divergent; mandible tridentate, with a median tooth and 2 lateral teeth; inner tooth present; mandible very long, as long as scape; mandibular shaft without spurs on longitudinal ridges, malar sulcus prominent; occipital carina distinct; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1 (Fig. 17).

Mesosoma: MW: ML= 43: 38, sculpturing same as that on head, with fine hairy punctures (Fig. 16); mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1 Female, INDIA, Meghalaya, Umium, 13-viii-13, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3602).

Etymology: Black colour of the species gives its name. In Latin '*Nigrum*' means 'black'.

Discussion: This new species keys to couplet no.4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is similar to *E. mirissimus* Dodd in having 5 claval antennomeres, mandibular shaft with inner tooth and slender clypeus with wrinkled central part. The following characters differentiate this new species from *E. mirissimus*: a) eyes hairy (in *E. mirissimus* eyes bare); b) EDM/ EOD= 6.6 (in *E. mirissimus* EDM/ EOD= 2.8).

ACKNOWLEDGMENT

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Revision of the genus *Gampsocera* Schiner (Diptera: Chloropidae: Oscinellinae) from India with descriptions of seven new species

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ABSTRACT: Seven new species of *Gampsocera* Schiner namely, *keralensis, khasiensis, lutea, nongpohensis, pentastriata, spindulata* and *trimaculata* from India are described. Besides this *longicosta* (Cherian) and *luteopilosa* (Cherian) are transferred **(n. comb.)** from *Elachiptera* Macquart to *Gampsocera* Schiner. *Elachiptera bengalensis* Cherian and *Gampsocera mutata* var. *grandis* Lamb are synonymised with *G. mutata* (n. syn.). A key to and additional notes on all species of *Gampsocera* known from India are given. All seven new and two of the known species, *longicosta* (Cherian) and *luteopilosa* (Cherian) are endemic to India.

KEYWORDS: Grass-flies, Oscinellinae, Gampsocera, seven new species.

INTRODUCTION

Andersson (1977) had proposed the "*Gaurax*-group" of genera and placed *Cestoplectus* Lamb, *Gaurax* Loew, *Gampsocera* Schiner and *Pseudogaurax* Malloch under the group which was later followed by Kanmiya (1983). Nartshuk (1983), while revising the genera of Chloropidae of the world, added five more genera, *viz*., *Eugaurax* Malloch, *Hapleginella* Duda, *Leucochaeta* Becker, *Pselaphia* Becker, and *Pterogaurax* Duda to the group and placed all these nine genera under the tribe Botanobiini erected by her. Of these six genera namely, *Cestoplectus, Gampsocera, Gaurax, Hapleginella, Pselaphia* and *Pseudogaurax* are distributed in the Oriental Region of which all except *Pselaphia* have been reported from India.

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Gampsocera is a genus of medium size known by thirty six species from the world. It reaches its maximum development in the Oriental Region from where twenty three species have been reported, of which only two, *notata* de Meijere (1910) and *mutata* Becker (1911) are so far known from India. Seven new species from India are described here and *luteopilosa* Cherian and *longicosta* Cherian earlier placed under *Elachiptera* Macquart, are transferred to *Gampsocera.* Besides, *Elachiptera bengalensis* Cherian from India and *Gampsocera mutata* var. *grandis* Lamb from Sri Lanka are synonymised with *G. mutata.* Additional notes on and revised key to species of *Gampsocera* from India are given. Eleven species of *Gampsocera* recorded from India represent 24.44 % of the forty five known world species, including the seven new species described and two species transferred to this genus below, known from the world. Of these, nine species representing 20% of the known species of the world are endemic to India.

MATERIAL EXAMINED

The type specimens of all the new and known species erected by the author and all the other specimens identified and studied are retained for the present in the collections of the Department of Zoology, University of Kerala, Thiruvananthapuram (Trivandrum) and shall later be deposited in the National Collections, Western Ghats Regional Center, Zoological Survey of India, Kozhikode (Calicut).

RESULTS AND DISCUSSION

Genus *Gampsocera* Schiner

1862. *Gampsocera* Schiner, *Wien. Ent.* Monatsschrift. **6**:431. Type-species *Gampsocera numerata* (Heeger) (= *Chlorops numerata* Heeger). By monotypy.

1933. *Lordophlep*s Enderlein, *Ark. Zool.,* (1936) **27** B (3): 1. Type-species *Lordophleps curvinervis* (Becker) (= *Gampsocera curvinervis* Becker). By monotypy. Synonymy by Sabrosky, 1977.

Diagnostic characters:

Small to medium sized *Elachiptera*-like flies often having erect, obliquely prolonged or highly reniform *ant* 3 and more or less distinctly flattened or basally thickened terminally placed arista bearing long hairs; head squarish; frons normally wider than long, tomentose, with a few *fr*; frontal triangle smooth, shiny, yellow, dark brown or black, reaching middle or three-fourths length of frons; eye large, rounded, squarish or slightly oval with dense pubescence and vertical or a little oblique long axis; anterior ommatidia usually large; gena narrow, width much less than that of *ant* 3; oral setae prominent; parafacialia not developed; head bristles developed; *ovt*, *ivt* and *pvt* normally subequal, the last upright and cruciate; *orb* about 5 to 6, posterior 2-3 a little longer; *oc* upright, cruciate; scutum rather flat, glabrous, shiny, usually with brown or black markings or longitudinal stripes to almost completely black and with pale

white or dark hairs parted along *acr* and *dc* lines; humeral callus with or without spots; pleura smooth, mostly shiny or with dark maculae; scutellum nearly rounded, rarely subtriangular, convex, shiny, with a few hairs; *h* 1 distinct; *npl* 1+2, subequal; *pa* 1, *pa* 2 and 1 *dc* developed; *as* nearly as long as scutellum or longer; *ss* 1-2; legs slender, yellow or partly black; tibial organ present; femoral organ absent; wing of *Oscinella*-type, hyaline or with black or brown spots or maculae; veins near maculae at times curved; haltere yellow to brownish yellow; abdomen oval, fifth tergite in male often paler than the preceding ones and narrowly elongate; female cerci long and slender; male genitalia with fused phallic complex, simple, small and short surstyli, small cerci and flattened epandrium: hypandrium weakly developed, mostly in narrow band form, open distally; dorsal plate of phallapodeme not broadened; basal stalk of phallapodeme narrowly elongate and produced beyond basomedian margin of hypandrium.

Distribution: Afrotropical, Nearctic, Neotropical, Oriental and Palaearctic Regions.

Remarks: This genus shows close affinities to *Gaurax* Loew but differs in possessing narrow face, usually dorsodistally prolonged and narrowed *ant* 3, mostly flattened arista, simple surstyli and short, not widely separated and weakly developed cerci.

The relatively high percentage of species diversity and 20% of endemicity observed in this genus in India, mentioned earlier, may primarily be due to the paucity of comparable information on the diversity of this genus from the rest of the world. It is presumed that the relative percentage of richness of this genus in India may come down as other species-rich areas of the world are thoroughly explored.

Key to species of *Gampsocera* Schiner known from India

1. Wing with dark or deeply brown spots or maculae…….....2

   Wing without spots or macula……..……..…….....…….....……7

2. Wing long and narrow, 3.8× as long as wide; a large blackish brown macula covering entire distal part of first posterior cell which narrowly spreads to upper part of second marginal cell terminally is present; anal area greatly receding; legs very long and very slender.....*pentastriata* sp. n.

   Wing not very long and narrow, less than 3.5× as long as wide and with two or more maculae; anal area normally developed, rarely slightly receding; legs relatively not very long and slender.....3

3. Second sector of costa longer than third and 3× or more the fourth sector; terminal sector of M1+2 concave above medially or at about two-thirds its length 4

Second sector of costa shorter than third sector; terminal sector of M1+2 nearly straight or convex above medially…….....5

4. Second sector of costa 1.5× the third and 3× the fourth sector; terminal sector of R4+5, gradually becomes convex above along three-fourths of its length and then straightens along a short distance and bends upwards terminally before joining costa; first posterior cell spindle-shaped in distal part; whole of marginal, part of submarginal first posterior and second posterior cells with diffused to partly distinct dark brown to deeply brown colouration or maculae..... *spindulata* sp. n.

Second sector of costa 2.7× the third and almost 4× the fourth sector; terminal sector of R4+5 nearly straight; marginal cell hyaline; wing with a small irregular dark brown macula in the middle of distal margin of first posterior cell, a little larger macula in second posterior cell bordering wing margin, a small dark patch in the middle of wing in second posterior cell touching M1+2 and somewhat inconspicuous dark line in first posterior cell, touching R4+5……..... *longicosta* (Cherian).

5. Second sector of costa much shorter than fourth sector; wing with one small and another large black macula of which the small, nearly 8-shaped one lies medially and the larger one terminally and both cover part of submarginal and first posterior cells….....*notata* de Meijere

Second sector of costa longer than fourth sector; wing with two small and one slightly large brownish maculae submedially on marginal, submarginal and first posterior cells or marginal cell almost wholly, submarginal cell mostly and first posterior cell distally with brown to dark brown colouration ……..….....6

6. Scutellum yellow to brownish yellow, often with dark tinge on dorsum; scutum and scutellum dull, the former with dark brown incomplete longitudinal stripes and punctate hairs; marginal and submarginal cells with small and first posterior cell with slightly bigger deeply brown maculae; terminal sector of M1+2 convex above….....*trimaculata* sp. n.

Scutellum black; scutum and scutellum shiny, the former predominantly black with yellow colouration confined to sides or rarely with two narrow yellow longitudinal stripes; marginal cell almost wholly, submarginal cell mostly and first posterior cell distally with deeply brown to dark brown colouration; terminal sector of M1+2 nearly straight..……...*khasiensis* sp. n.

7. Legs yellow, with or without dark tinge on some tarsi…….……..….....8

Tibiae almost wholly and femora partly black or dark brown…..……..……....…....9

8. *ant* 3 not prolonged dorsodistally; *as* widely separated at base; gena more than half as wide as *ant* 3; scutellum almost wholly and dorsum of scutum, except for yellow sides and posterior part, black; all tarsi yellow…….....*lutea* sp. n.

   ant 3 prolonged dorsodistally; *as* not widely separated at base; gena 0.2× as wide as *ant* 3; dorsum of scutum and scutellum partly yellow; one or two tarsal segments, especially of hind legs, infuscated ……..*nongpohensi*s sp. n.

9. Arista slender; *r-m* cross-vein basad of middle of discal cell……..... *keralensis* sp. n.

   Arista partly or greatly thickened; *r-m* cross-vein in middle or distad of middle of discal cell ……..…..... 10

10. Arista greatly thickened, almost sword-shaped; dorsum of scutum medially wholly black…….....*mutata* Becker

    Arista only slightly thickened with nearly slender flagellum; scutum black with yellow longitudinal stripes.....*luteopilosa* (Cherian)

Gampsocera notata de Meijere

1910. *Gampsocera notata* de Meijere, *Tijdschr. Ent*., **53:** 152. Type locality: Java: Djakarta: Batavia.

1934. *Elachiptera notata* var. *flavipes* Duda (=*Gampsocera notata* de Meijere var. *flavipes*). *Tijdschr. Ent*., **77:** 66, 73. Type localities: Java; Djakarta: Batavia; Sumatra: Fort de kock. Synonym by Sabrosky, 1977.

1934. *Elachiptera notata* var. *obscurata* Duda (=*Gampsocera notata* de Meijere var. *obscurata* Duda). Tijdschr . Ent., **77:** 66, 73. Type locality: Sumatra: Fort de Kock; Synonym by Sabrosky, 1977.

Diagnostic characters*:* Head much wider than long, length, height and width ratio 3:4:5; frons nearly parallel sided, widening at vertex, width at point of widening half that of head and 0.8x its own length, projecting a little above but not beyond anterior margin of eye, finely grey tomentose, yellow with slight dark tinge on area around vertex; frontal triangle subshiny, partly tomentose, almost wholly brownish black but in some specimens with yellow tinge at vertex margin, reaching two-thirds length of frons and ending with broadly obtuse apex; facial carina low and hardly reaching one-third length of face; *ant* 3 prolonged dorsodistally, 0.4x as wide as long, brownish yellow but infuscated along dorsal margin; arista thickened, black with concolourous well developed hairs; gena gradually narrowing anteriorly, width in the middle about one-fourth length of *ant* 3; vibrissal corner receding, very narrow; postgena

reduced; eye large, densely and conspicuously pubescent, with vertical long axis; *ovt* and the convergent *pvt* subequal and longer than *ivt*; *oc* erect, half as long as *ivt*; *orb* 6, reclinate; thorax a little wider than head; scutum 0.95x as long as wide, subshiny brownish black medially and brownish yellow at sides and posteriorly below level of 1 *dc*, partly finely tomentose with convex disc bearing finely punctate pale hairs; pleura subshiny, partly finely tomentose, deeply brown but for brownish black major part of *anepst*, much of *kepst* and *anepm* and part of propleuron; scutellum almost wholly brownish black with brownish tinge along anterior margin in one specimen, nearly semicircular, subshiny, 1.5x as wide as long with convex disc bearing a few scattered pale hairs; *as* not widely separated at base, recalling the condition in *mutata*, a little longer than scutellum; distance between bases of *as* less than that between *as* and *ss* 1; wing more than 3.4x as long as wide, hyaline with nearly '8'-shaped brownish black macula of medium size around middle of R4+5 which covers part of submarginal and 1st posterior cells medially; there is a larger black macula which covers terminal part of 1st marginal cell and more than three-fourths of distal part of 1st posterior cell; proportions of costal sectors 2-4 in the ratio 8:23:11; terminal sector of R4+5 bending a little upwards towards costa distally; *r-m* cross-vein nearly in the middle of discal cell; anal area receding; haltere yellow; M1+2 bending downwards and joining costa a trifle below apex of wing; legs long and slender, in two specimens wholly yellow but in one from the same locality all the legs, especially tibiae, are a little infuscated; abdomen slender, much narrower than thorax, dull brownish black.

Distribution: India: Assam, Meghalaya, Indonesia: Sumatra, Java, Malaysia, Vietnam.

Specimens studied: 2 ♂: India: Meghalaya: Nongpoh, 1760 m, 18.iv.1980, Coll. P.T. Cherian; 1 ♂: India: Meghalaya: Shillong, 18.iv.1980, Coll. P.T.Cherian.

Remarks: Based on differences in the colouration of legs, scutum and pleura, Duda (1934) erected two varieties of *Elachiptera notata, viz., obscurata* (from Sumatra) and *flavipes* (from Java) but Sabrosky (1977) considered them only varieties of *notata.* Based on the study of specimens during the present investigation, I agree with Sabrosky since specimens collected from the same locality on the same day showed differences in extent and pattern of colouration of scutum, pleura and legs. Hence I also consider both these 'varieties' conspecific.

***Gampsocera pentastriata* sp. n.** (Figs. 1- 3)
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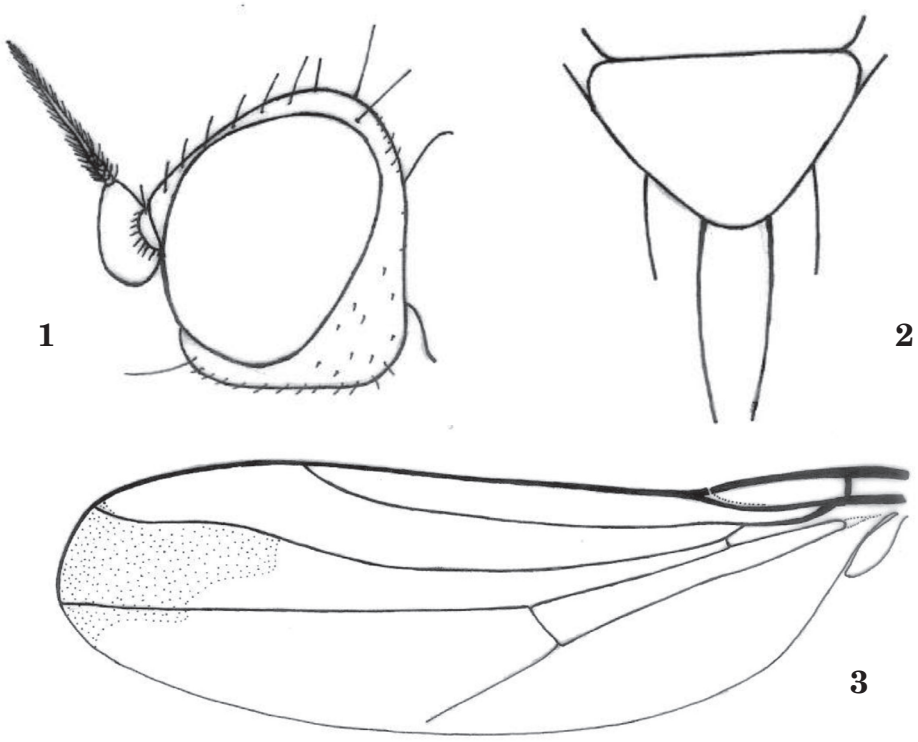
Male: *Head:* (Fig. 1): Much wider than long, length, height and width ratio 13:15:19. Frons gradually widening at vertex, 0.8x as long as wide and 0.6x as wide as head, yellowish brown, finely and densely grey tomentose, projecting a little above eyes anteriorly and with a few short, slender dark brown *fr*; frontal triangle glabrous, non-tomentose, dark brown with diffused yellow tinge at sides of ocellar triangle and mid-longitudinal area, reaching three-fourths length of frons and ending with narrowly obtuse apex. Face much narrower than frons, longer than wide with dark tinge, lower half nearly 'v'-shaped and tomentose; facial carina very



Figs. 1- 3. *Gampsocera pentastriata*, sp. n. 1- head, 2- scutellum, 3- wing

short, confined to area between bases of antennae; epistomal margin slightly raised, yellowish brown, densely grey tomentose. Basal antennal segments yellowish brown; *ant* 3 prolonged dorsodistally as in *mutata*, more than 1.5x as wide as long, yellowish brown with dark tinge especially along dorsodistal margin; arista terminal, thickened as in *mutata* but a little longer, dark brown with dense well developed black hairs. Gena yellowish brown at its middle, 0.4x as wide as median length of *ant* 3; oral margin with a row of well developed setae of which anterior ones are more long; vibrissal corner greatly receding; postgena well developed, concolourous with gena, with a few punctate hairs. Eye large, fairly densely and conspicuously pubescent, with vertical long axis. Palpi yellow; proboscis blackish brown, tomentose with a few short hairs. Head bristles dark brown; *ovt* and cruciate *pvt* subequal; *ivt* a little shorter than *ovt*; *oc* erect, convergent; *orb* about 6, reclinate, posterior ones progressively becoming longer; *if* in a row of about 6 along outer margin of frontal triangle.

Thorax: Almost as wide as head. Scutum greatly convex, 0.8x as wide as long, brownish yellow with five shiny black longitudinal strips of which median is broad and runs along whole length of scutum, narrows posteriorly before reaching posterior margin, each sub-

median is narrow and commences from transverse suture and runs only a short distance and each lateral one appears confluent with median one and reaches base of *pa* 1 where it is a little broadened; there is a black patch above transverse suture almost in line with median and lateral bands. In the holotype, median and sub-median bands are confluent and hence whole of median part of scutum is blackish; hairs on scutum slender, fairly dense, finely punctate and whitish yellow; humeral callus yellow with diffused dark tinge in middle. Scutellum (Fig. 2) 0.6x as long as wide, subtriangular, wholly shiny black in one specimen but with yellow lateral and distal margins in the other so that black colour is confined to its median part. Pleura yellowish brown, partly tomentose; *kepst* and meron almost wholly in one specimen and partly in the other shiny black; *anepst* and *anepm* partly shiny black. Thoracic bristles long slender, brownish black; *h* 1 shorter than *ovt*; *npl* 1+2, subequal; *pa* 1 a little longer than and 1 *dc* subequal to *npl*; *pa* 2 hair-like; *as* 1.3x as long as scutellum, not very widely separated at base; *ss* 1 about half as long as *as*; distance between bases of *ss* 1 and *as* more than that between that of *as*.

Wing (Fig. 3): Long and narrow, relatively narrower than in most species, 3.8x as long as wide, with dark brown veins and deeply brown hairs; proportions of costal sectors 2-4 in the ratio 50:27:13; *r-m* cross-vein basad of middle of discal cell, opposite 0.4 of its length; discal cell long and narrow; terminal sector of M1+2 nearly straight, that of R4+5 abruptly becoming convex above distally at about four-fifths length of wing and after a distance becomes nearly straight but bends slightly upwards before joining costa; there is a large blackish brown macula, commencing at the level where R4+5 bends upwards and becomes convex above and it gradually widens and covers entire distal part of first posterior cell; this macula spreads narrowly over to upper part of second posterior cell along margin of M1+2 and margin of wing which is conspicuous in one specimen and less so in the other; anal area greatly receding. Haltere yellow but in one specimen knob with dark tinge.

Legs: More long and slender than in most species of the genus, predominantly yellow with diffused dark tinge on coxa especially of fore legs and anterodorsal and ventral margins of femora; all tibiae also with diffused dark tinge; fore tarsi almost wholly infuscated, tarsal segments of mid and hind legs mostly appearing a little darkened in some angles of illumination.

Abdomen: Long, much narrower than thorax, blackish brown with yellow tinge on basal segments.

Length: ♂ 1.8 mm; wing 2.1 mm.

Etymology: The species derives its name from the five longitudinal stripes on scutum.

Holotype: ♂: India: Kerala: Trivandrum Dist., Kariavattom, 25♂, 18.iv..2004, Coll. P.T. Cherian.

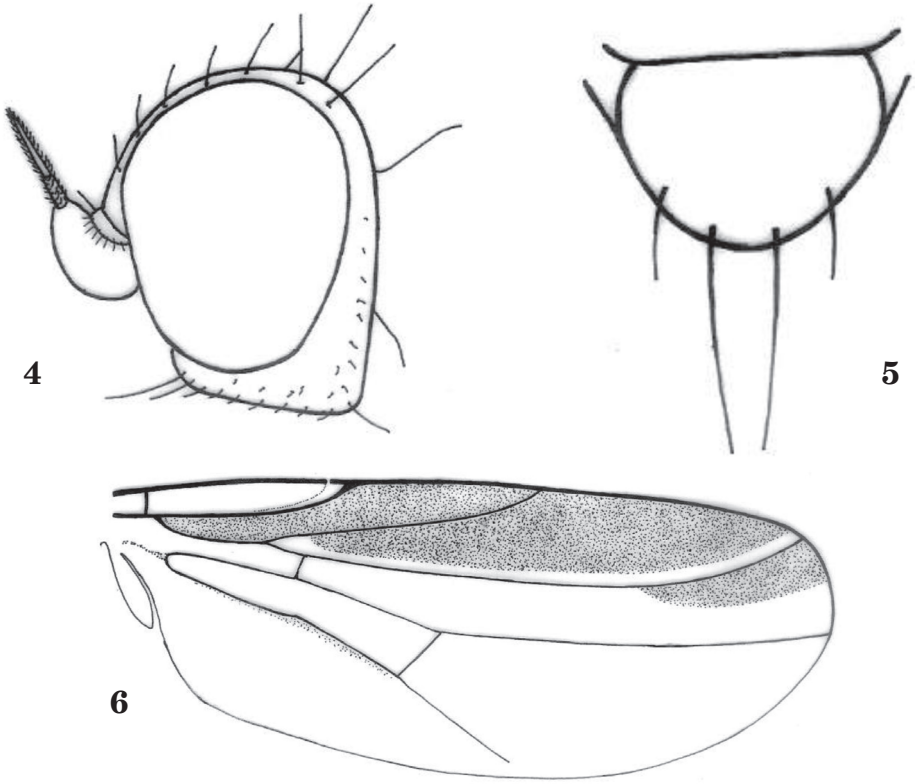
Paratype: 1 ♂, collection data same as that of holotype.

Remarks: This species shows affinities to *notata* de Meijere but differs especially in having long and very narrow wing which is 3.8x as long as wide, a large blackish brown macula covering entire distal part of first posterior cell which narrowly spreads to upper parts of second posterior and marginal cells terminally and greatly receding anal area. Besides, in *pentastraiata r-m* cross-vein is basad of middle of discal cell, second sector of costa is much longer than third and fourth sectors together and gena is relatively wider. But in *notata* wing is not very narrow, position and size of maculae on wing are very different from that of *pentastriata*, *r-m* cross-vein is nearly in the middle of discal cell, second costal sector is shorter than third and fourth sectors, gena is relatively more narrow and anal area is not greatly receding.

***Gampsocera khasiensis* sp. n.** (Figs. 4-6)
urn:lsid:zoobank.org:act:F7CA77C7-8623-4CBC-B308-DF8795C4B5DE

Male, *Female*: *Head* (Fig. 4): Higher than long, length, height and width ratio 9:12:16. Frons widening at vertex and slightly narrowing anteriorly, width at vertex 0.56x that of head and 0.9x as long as wide, in most specimens projecting above eye margin anteriorly, densely grey tomentose, dull yellow with dark tinge in its widened area at vertex; frontal triangle partly tomentose, shiny to subshiny brownish black with yellow tinge at vertex, partly along sides and around anterior margin, reaching two-thirds length of frons and ending with nearly pointed apex. Face deeply concave, narrow, higher than wide, yellowish brown and densely grey tomentose; facial carina prominent between bases of antennae and running as a raised ridge reaching about one-third length of face where it fades off almost abruptly; epistomal margin only slightly raised up, shiny dark brown . Basal antennal segments brown; *ant* 2 with a row of brown hairs along distal margin; *ant* 3 reniform, 2.2x as wide as long, yellow but in some specimens mostly with light to very deep brown tinge especially along antero-distal margin and with fairly dense fine pubescence; arista terminal, hardly longer than *ant* 3, thickened all along and gradually narrowing towards apex, black with short fairly dense concolourous hairs. Gena narrow, width in the middle about one-fifth that of *ant* 3, shiny yellow but finely grey tomentose around area of vibrissal corner which is receding and rounded; postgena shiny, concolourous with gena, not well developed. Eye large, fairly densely and conspicuously pubescent with vertical long axis. Palpi yellow; proboscis short, brownish black. Head bristles brownish black, *ovt* and convergent *pvt* subequal; *ivt* a little shorter than *ovt*; *oc* erect, half as long as *ivt*; *orb* about 5, reclinate, progressively anterior ones becoming shorter.

Thorax: Scutum 0.9x as wide as long with convex disc which is densely tomentose, blackish medially and less tomentose and yellow at sides and in the area of 1 *dc* and a little below posteriorly; in some specimens dorsum is less tomentose, partly shiny and yellow colouration at sides and posteriorly cover larger areas; in two specimens, yellow colouration on dorsum is in the form of two yellow stripes running from posterior margin to transverse suture and faintly a little upwards along *dc* lines. Humeral callus well developed, almost wholly yellow but in some specimens with dark tinge medially. Pleura subshiny to partly shiny with dark tinge in some areas; *anepst*, *kepst*, *anepm* and meron mostly and propleuron partly with dark



Figs. 4- 6. *Gampsocera khasiensis*, sp. n. 4- head, 5- scutellum, 6- wing.

tinge. But in some specimens, pleura is predominantly yellow with dark tinge limited to some areas only. Scutellum (Fig.5) 1.5x as wide as long, nearly semicircular, subshiny black with a few short pale hairs which are less dense than on scutum. Thoracic bristles rather slender, *h* 1, 1+2 *npl*, *pa* 1, *pa* 2 and 1 *dc* as in *pentastriata*; *as* not very widely separated at base, as long as scutellum; *ss* 1 half as long as and widely separated at base from *as*.

Wing (Fig. 6): Hyaline with dark brown maculae covering almost whole of marginal cell and much of the area of submarignal cell except for the basal part and narrow stripe along upper margin of R4+5; besides, there is another macula covering upper half of distal part of first posterior cell; third sector of costa 1.5*x* as long as second and much longer than forth sector; *r-m* cross-vein basad of middle of discal cell, opposite 0.4 of its length; terminal sector of R4+5 rather abruptly bending upwards towards costa along about one-fourth of its length distally and hence in that area prominently diverging from M1+2; anal area receding. Haltere yellow.

Legs: Coxa, trochanters and femora wholly yellow but in some specimens anterodorsal margin especially of mid and hind femora with light dark tinge; fore and mid tibiae distally and hind tibia mostly dark brown but for yellow basal part and part of the rest of the areas; tarsi predominantly yellow with light to deeply brown tinge on most segments especially distal ones; tibial organ very conspicuous, narrow and oval.

Abdomen: subshiny, much narrower than thorax; two basal segments brownish yellow, a little broader than rest of the segments which are blackish brown and with short, fine hairs.

Length: ♂ 2.1 mm; wing 2.3 mm
♀ 2.3 mm, wing 2.4 mm

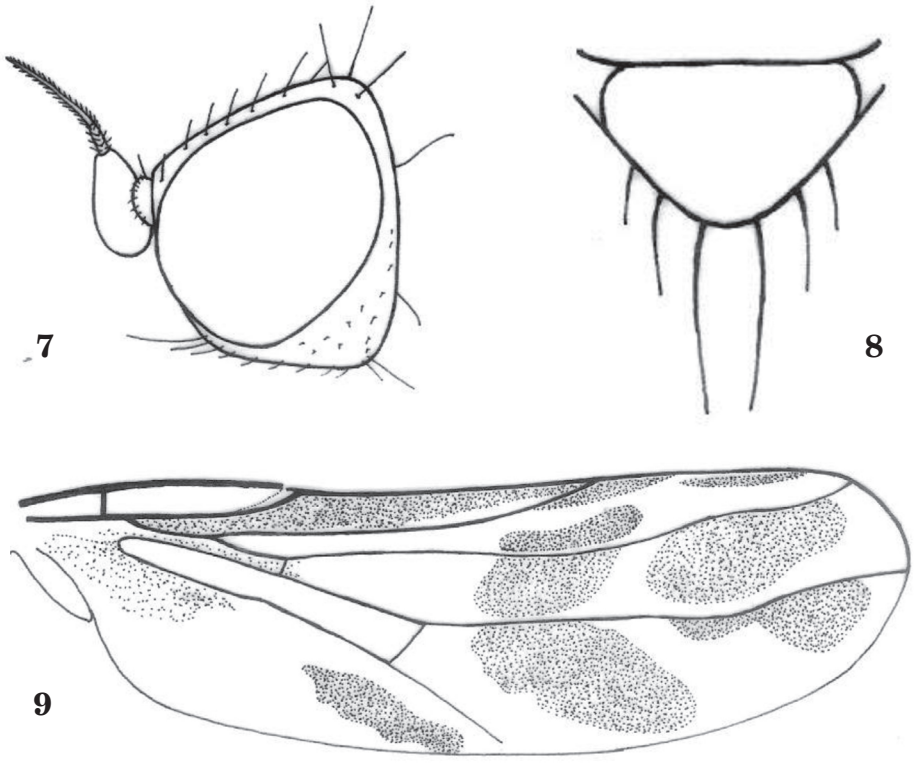
Etymology: The species is named after Khasi Hills in Meghalaya state from where the majority of paratypes were collected.

Holotype: ♂: Mizoram: Lunglei Dt., Hnathisal, 24.iii.1979, Coll. P.T. Cherian. *Paratypes*: 1 ♂, 2 ♀, India: Meghalaya: Nongpoh 18.iv.1980, Coll. P.T. Cherian; 2 ♀ (abdomen damaged), India: Mizoram, Kolasib, 8.iii.1979, Coll. P. T. Cherian.

Remarks: *G. khasiensis* shows affinities to *poeciloptera* Becker from Java in general characters. However in *khasiensis*, third sector of costa is 1.5x as long as second and longer than fourth sector, marginal cell is almost entirely and submarignal cell but for its base and a narrow stripe along upper margin of R4+5 are with large dark brown maculae and 1st posterior cell in upper part distally also is with such a macula. In addition in *khasiensis* femora are almost entirely yellow. But in *poeciloptera* third sector of costa is shorter than second and fourth sectors, wing in anterior margin at end of R2+3 and R4+5 is with a large dark brown macula which is interrupted by 4 or 5 circular spots, first posterior cell is entirely hyaline and femora distally are broadly brownish black.

***Gampsocera spindulata* sp. n.** (Figs. 7-9)
urn:lsid:zoobank.org:act:AD687F77-26CA-4B2C-A36D-DABD5E9DEB12

Male, *female*: *Head* (Fig. 7): Much wider than long, length, height and width ratio 13:16:20. Frons shiny, very finely and sparsely to densely grey tomentose, 1.2x as wide as long and 0.6x as wide as head, yellowish brown especially in anterior part, rest of the area partly infuscated more along eye margins; frontal triangle at vertex two-thirds as wide as frons, shiny brownish black especially in one specimen, with yellowish brown tinge in area around vertex, reaching two-thirds length of frons and ending with narrowly obtuse apex; in one specimen in the triangle two to three small tomentose patches are present and area at sides and just in front of ocellar triangle yellow. Face deeply concave, much narrower than frons and higher than wide, yellowish brown and finely grey tomentose; facial carina triangular between antennae and reaching as linear ridge to one-third length of face; epistomal margin raised up, tomentose, brownish yellow. Basal antennal segments yellow; *ant* 3 prolonged dorsodistally, 2.2x as wide



Figs. 7- 9. *Gampsocera spindulata*, sp. n. 7- head, 8- scutellum, 9- wing

as long, predominantly yellow and grey tomentose with dense very fine hairs and dark tinge along dorsodistal margin and area around base of arista; arista slightly thickened at base and becoming slender distally, brownish black with fairly dense well developed concolourous hairs. Gena yellowish brown with dark tinge along oral margin, width in the middle about one-fourth length of *ant* 3, becoming more narrow, rounded and receding at vibrissal corner; vibrissal corner not projecting beyond anterior eye margin; postgena moderately developed but slightly infuscated. Eye large, oval, densely and conspicuously pubescent with oblique long axis. Palpi brownish yellow; proboscis short, shiny dark brown. Head bristles brownish black, *ovt* and cruciate *pvt* subequal, *ivt* a trifle shorter than *ovt*; *oc* erect and slightly reclinate; *orb* about 5, posterior ones progressively becoming longer, longest one two-thirds as long as *ivt*; *if* short, hair-like, in a row along outer margin of frontal triangle.

Thorax: Scutum as wide as head and 0.9x as wide as long, shiny, finely and sparsely tomentose with short fairly dense yellow hairs and with three broad shiny black longitudinal bands separated by very narrow yellow longitudinal stripes which are hardly discernable especially in the holotype that the whole of dorsum of scutum except for yellow sides and narrow area

between longitudinal bands posteriorly appear black; median band narrows a little before joining margin of scutellum. Humeral callus yellow with dark median macula. Pleura shiny yellow with deeply brown to brownish black diffused maculae covering some areas of *anepst*, much of the area of *anepm*, part of meron and lower part of *kepst*. Scutellum (Fig. 8) shiny black, subtriangular, 0. 62x as long as wide with convex disc bearing a few yellow hairs. Thoracic bristles black; *h* 1 nearly as long as *ovt*; *npl* 1+2, subequal, equal to 1 *dc*; *pa* 1 a trifle longer than *npl*; *as* a little longer than scutellum, not very widely separated at base, recalling the condition in *pentastriata*; *ss* 1 nearly half as long as *as*; distance between bases of *ss* 1 and *as* more than that between the *as*; *ss* 2, 0.4x as long as *ss* 1.

Wing (Fig. 9) : Long and narrow but not so narrow as in *pentastriata*, 3x as long as wide, hyaline with very deeply brown maculae; proportions of costal sectors 2-4 in the ratio 15:11:5; *r-m* cross-vein distad of middle of discal cell, opposite 0.52 of its length; terminal sectors of R4+5 and M1+2 nearly parallel along part of their lengths basally but the former gradually becomes convex above along three-fourths of its length and then straightens along a short distance before slightly bending upwards and joining costa; M1+2 gradually becomes concave above in the area corresponding to the convexity of R4+5 whence it straightens before joining wing margin so that the two veins becomes spindle-shaped in distal part of wing; anal area slightly receding; there is a large very deeply brown macula covering whole of marginal cell, an uneven partly diffused such macula which covers part of submedian part of submarignal, first posterior and second posterior cells, a fairly large suboval macula in first posterior cell where R4+5 and M1+2 are spindle-shaped and a fairly large macula in second posterior cell along margin of M1+2 in the area where it is concave above and also a little beyond and behind so that they join; apart from the maculae much of the basal part of wing including part of basal radial (first basal) and anal field basally also with diffused brown tinge. Haltere yellow.

Legs: Long and slender, wholly yellow except that hind femur is infuscated along its anterodorsal and anteroventral margins and hind tibia is partly darkened especially in basal half. Tibial organ very distinct.

Abdomen: Much narrower than thorax, subshiny brownish black with slender hairs. Distal segments of abdomen of female broken off.

Length: ♂ 1.8 mm; wing: 1.9 mm
♀ 2.1 mm; wing 2.2 mm

Holotype: ♂, India: Meghalaya: Nongpoh, 18.iv.1980, Coll. P.T.Cherian.

Paratype: 1 ♀ (partly damaged), collection data same as that of holotype.

Etymology: The species derives its name from the spindle-shaped first posterior cell of its wing.

Remarks: *G. spindulata* shows affinities to *khasiensis* but in the former second sector of costa is much longer than third sector, *r-m* cross-vein is only slightly beyond middle of discal cell and terminal sectors of R4+5 and M1+2 form a spindle-shaped area in distal part of wing while in the latter species second sector of costa is shorter than third sector, *r-m* cross-vein is far before middle of discal cell and terminal sectors of R4+5 and M1+2 do not form a spindle-shaped area distally. Besides, the pattern of colouration of wing in the two species is entirely different.

***Gampsocera trimaculata* sp. n.** (Figs. 10-12)
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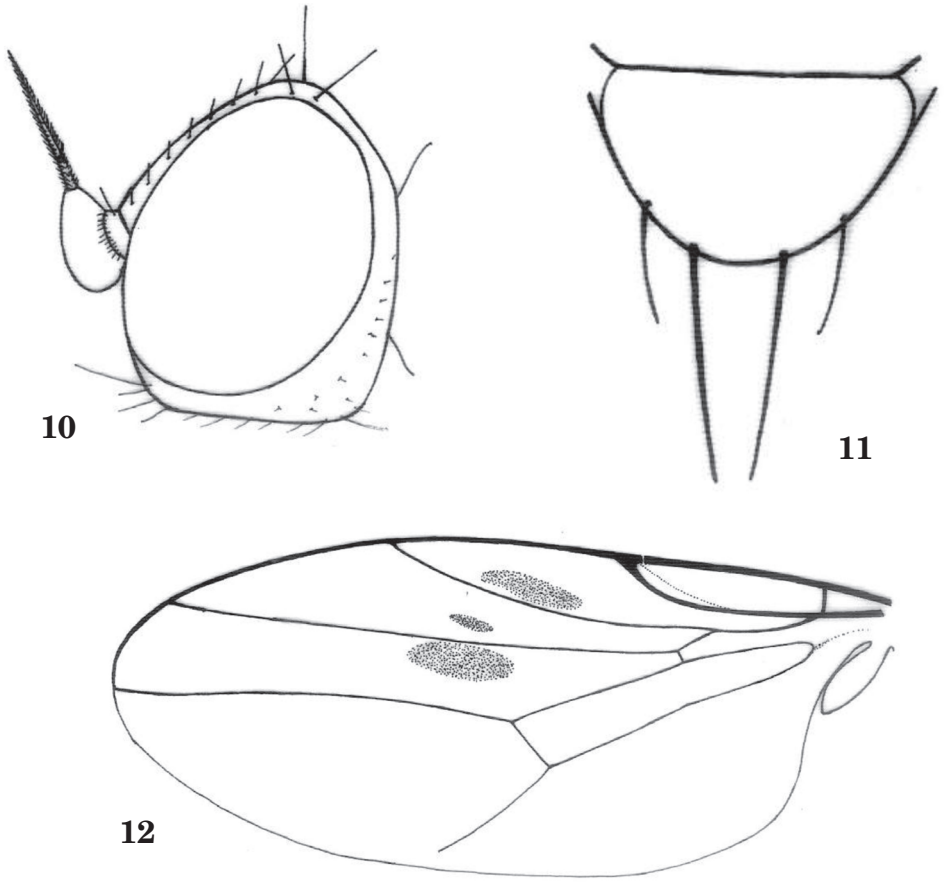
Male, Female: Head (Fig. 10): Higher than long, length, height and width ratio 7:8:10. Frons nearly parallel-sided but widening at vertex, 0.85x as long as wide and at level of posterior ocelli 0.6x as wide as head, fairly densely grey tomentose, dull yellowish brown but partly with dark tinge. Frontal triangle two-thirds as wide as frons at vertex, subshiny, mostly brownish black in the area beyond anterior ocellus and yellowish brown at vertex but in some specimens almost wholly brownish yellow with irregular dark tinge confined to some areas, reaching two-thirds length of frons and ending with broadly obtuse apex. Face yellowish brown, densely tomentose, higher than wide; facial carina triangular between antennae and hardly reaching linearly middle of face; epistomal margin convex, slightly projecting. Antennal segments almost wholly yellow but rarely with dark tinge around anterodistal margin of *ant* 3; *ant* 3 prolonged dorsodistally, 2x as wide as long; basal segment of arista thickened, flagellum slightly thickened around base but becomes slender along much of its length distally, wholly with very dense long black hairs which are longer than width of arista around its base. Gena subshiny yellow, width about one-fourth that of *ant* 3; vibrissal corner receding, rounded; postgena concolourous with gena, of medium size with a few pale hairs; there is a row of slender postocular setae. Eye large, very densely and conspicuously pubescent with oblique long axis. Palpi rather slender, cylindrical, yellow; proboscis short, partly dark brown. Head bristles dark brown; *ovt* and *pvt* subequal; *ivt* a little shorter than *ovt*; *orb* 6, erect to slightly reclinate; *oc* erect, as long as longest *orb*.

Thorax: As wide as head. Scutum dull, densely grey tomentose, more coarsely punctate than in all the species from India so far known, with short dense yellow hairs, 0.9x as wide as long with gently convex disc; there are three broad rather not well defined brownish black longitudinal bands of which median runs whole length of scutum, each lateral one commences typically from level of posterior margin of humeral callus, is interrupted with yellow colouration especially at transverse suture and covers much of side of scutum. In some specimens median band is interrupted partly by uneven yellow tinge; in rare instances median band is divided by an yellow longitudinal stripe reducing it to two narrow brownish black stripes which hardly reach two-thirds length of scutum, leaving whole part yellow and imparting the appearance of two narrow median and broader submedian bands; humeral callus nearly yellow but for dark brown median spot. *anepst* and *anepm* densely grey tomentose, almost wholly brownish black; *kepst* rather shiny brownish yellow, partly tomentose with dark tinge confined to some



Figs. 10-12. *Gampsocera trimaculata*, sp. n. 10- head, 11- scutellum, 12- wing

areas. Scutellum (Fig. 11) less densely tomentose and pubescent than scutum, nearly semicircular, 1.4x as wide as long with convex disc which is typically yellow along anterior and dorsodistal margins and with dark tinge on dorsum but extent of dark tinge differs in different specimens so that in one or two specimens it is almost wholly dark brown. Thoracic bristles slender; *h* 1, 1+ 2 *npl*, 1 *dc*, *pa* 1 and *pa* 2 bristles as in *pentastriata*; *as* fairly widely separated at base, 1.1x as long as scutellum; *ss* 1 half as long as *as*; distance between bases of *ss* 1 and *as* nearly subequal to that between the two *as*; *ss* 2 two-thirds as long as *ss* 1 but more slender. In some specimens a short hair-like *ss* 3 is distinct.

Wing (Fig. 12): About 2.8x as long as wide, hyaline with pale brown veins; proportions of costal sectors 2-4 in the ratio 10:13:6; *r-m* cross-vein basad of middle of discal cell, opposite 0.43 of its length; terminal sector of M1+2 gently convex above along its entire length and joining costa a trifle beyond apex of wing. In males there are three deeply brown maculae of which a small diffused one is found submedially on marginal cell, a still smaller oval one submedially on submarignal cell before ending of second sector of costa and a little larger nearly suboval macula submedially in upper half of first posterior cell which touches R4+5; maculae on wings are absent in females. Anal area only slightly receding. Haltere yellow.

Legs: Slender, almost wholly yellow but in some specimens some femora and tibiae partly with diffused deeply brown tinge especially along dorsal and ventral margins.

Abdomen: Much narrower than thorax in male, subshiny blackish brown, partly finely tomentose with yellow tinge on margins of distal segments and with short slender hairs. Female cerci slender, of medium length, black with slender hairs.

Length: ♂ 1.1 mm; wing 1.4 mm
♀ 1.35 mm; wing 1.6 mm

Holotype: ♂, India: Kerala: Ernakulum Dist., Vaikom, 15.xii.1983, Coll. P. T. Cherian.

Paratypes: 5 ♂, 3 ♀, collection data same as that of holotype; 1 ♂, Kerala: Pallivasal, 7.xi.1983, Coll. M.S. Molly.

Etymology: The species derives its name from the three deeply brown maculae on the otherwise hyaline wing in males.

Remarks: This species comes close to *G. lunifer* Becker from Java. But while in *G. trimaculata* frontal triangle is partly darkened, scutum is coarsely punctate, second sector of costa is shorter than third sector, *r-m* cross-vein is prominently basad of middle of discal cell and there are three deeply brown maculae, one each on marginal, submarginal and first posterior cells almost in submedian part of wing in males and terminal sector of M1+2 is gently convex above along its entire length, in *lunifer* frontal triangle is reddish yellow, scutum is shiny black and only very finely punctate, second sector of costa is shorter than third sector, *r-m* cross-vein is nearly in the middle of discal cell, there are only 2 diffused maculae on wing of which one is located subterminally on first posterior cell and terminal sector of M1+2 is straight.

Gampsocera mutata Becker

1911. *Gampsocera mutata* Becker, *Ann. hist.nat. Mus. natn. Hung*. Budapest, **9**: 134. Type localities: Java: Batavia (Djakarta) and Wonosoba; Taiwan: Takao and Koshun.

1912. *Gampsocera trivialis* Becker*, Ann. hist.-nat. Mus. natn. Hung*. Budapest, **10**: 254. Type locality: Taiwan: Toyenmongai. Synonym by Sabrosky, 1977.

1918. *Gampsocera mutata* var. *grandis* Lamb, *Ann. Mag. nat. Hist.* London, (9) **1**: 390. Type locality: Sri Lanka: Peradeniya. **syn. n.**

1975. *Elachiptera bengalensis* Cherian, *Oriental Insects*, **9** (1):15. Type locality: India: West Bengal: Darjeeling. **syn. n.**

Diagnostic characters: Head as wide as long; frons dark brown to yellowish brown, half as wide as head and wide as long; frontal triangle glabrous, shiny brownish black, rarely appearing yellowish brown, reaching a little beyond two-thirds length of frons and ending with broadly obtuse apex; face and epistomal margin flattened, the latter projecting upwards; facial carina low, linear, reaching middle of face; *ant* 3 reniform, upper angle produced, 2.6x as wide as long, yellow to yellowish brown; arista terminal, flat, thickened but gradually narrowing towards apex; eye fairly large, squarish, with fine pubescence and oblique long axis; gena narrow; vibrissal corner rounded; head bristles slender, in some specimens all are yellow and in some others a few are blackish brown; *ovt* nearly half as long as width of eye; *ivt* a little shorter than *ovt*; *orb* 5-6, posterior two or three a little prominent; scutum convex, as wide as head, length and width subequal, in some specimens only median part brownish black and sides and posterior part yellow or brown, in others whole of dorsum black or brownish black with brown or yellowish brown tinge restricted to extreme lateral margins and a narrow area around 1 *dc*; humeral callus yellow or partly or wholly dark brown; scutellum broadly rounded, 1.2x as wide as long with white hairs as on scutum; *as* as long as scutellum; *ss* 1 half as long as *as*; distance between bases of *as* less than that between *as* and *ss* 1; wing of specimens from Himalayan region hyaline but in those from Trivandrum, which is nearer to the equator, wing is with darkish tinge; proportions of costal sectors 2 to 4 in the ratio 32:23:12 to 32:20:12; terminal sectors of R4+5 and M1+2 nearly parallel; legs yellow but for brownish black bands covering some areas of femora and some tibiae and infuscation on some tarsi; female cerci long and slender; epandrium only a little wider than long; hypandrium widely concave on ventral margin; postgonites large and flat.

Distribution: India: Assam, Kerala, Karnataka, Kurseong (E. Himalaya), Tamil Nadu West Bengal; Malaysia, Myanmar, Indonesia (Borneo, Java, Sumatra, Simeuluë I.), Sri Lanka, Taiwan, Thailand

Variations: In the nature and colouration of frontal triangle, colour of *ant* 3, scutum and wing, proportions of costal sectors and such other characters this species exhibits wide range of variations. Thus in some specimens frontal triangle is wholly shiny black, reaches a little beyond two-thirds length of frons and is with broadly obtuse apex but in a few it is partly with yellow tinge, reaches hardly two-thirds length of frons and is narrowly obtuse at apex. Extent of yellow colour at sides and posterior part of scutum also shows various ranges in development. In some specimens scutum is almost entirely black but in a few others it is partly

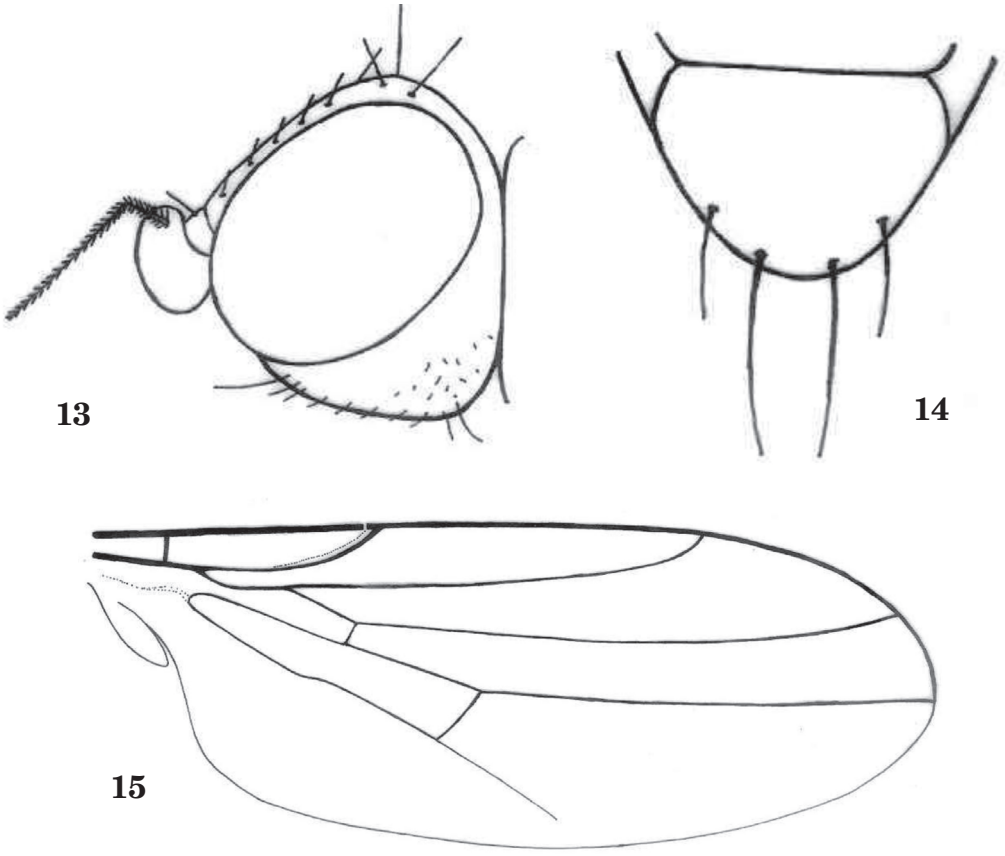
with yellow tinge. In a few specimens, especially from Himalaya, *ant* 3 is yellow with dark tinge confined to dorsal and dorsodistal margin but in specimens from southern parts of India it is almost wholly darkened with faint yellow tinge in lower half. Arista in some specimens is more yellowish than in others and in all appear black because of black hairs. Besides, colour of wing also exhibits variations.

Specimens studied: *Elachiptera bengalensis* Cherian: *Holotype*: ♀, India: W. Bengal: Darjeeling (West bank), 23.iv.1973, Coll. H.S. Sharma. *Paratype*: 1 ♀, collection data same as that of holotype. Other specimens studied: 3 ♀, W. Bengal: Calcutta, 13-16.ii.1979, Coll. Museum collector; 1 ♀, E. Himalaya: Kurseong, 4700-5000', 27.vi.1910, Coll. Annandale, 1 ♀, Tamil Nadu: Salem Dist., Yercaud, 4000', 2.xii.1975, Coll. A.N.T. Joseph; 1 ♀, Karnataka: Coorg Dist., Murnad, 3000', 4.iii.1977, Coll. P.T. Cherian; 1 ♂, India: Kerala: Trivandrum Dt., 25 m, 5.i.2004, Coll. P.T. Cherian; 1 ♀, India: Kerala: Trivandrum Dt., 25 m, 27.ix.2006, Coll. A.K. Shinimol; 1 ♀, India: Kerala: Trivandrum Dt., 25 m, 5.x.2006, Coll. A.K. Shinimol.

Remarks: Both the types of *Elachiptera bengalensis* Cherian were studied. It was found that the species comes under the genus *Gampsocera*. The minor differences observed in the specimens were found to fall within the range of variations in the specimens of *mutata* from various localities. Hence the species is transferred to *Gampsocera* and synonymised with *G. mutata*. Lamb (1918) in his original description of *grandis* from Sri Lanka considered it a variety of *G. mutata* because of differences in the size of the specimens, variations in colouration and relative lengths of costal sectors though he had not indicated the relative lengths of the costal sectors in *grandis*. Sabrosky (1977) in his catalogue on Oriental Chloropidae considered *grandis* a separate species. In Lamb's diagram of the wing of *grandis* it is apparent that lengths of costal sectors 2-4 are in the ratio 29:20:7 which agree with that in some typical specimens of *mutata*. As colouration of *ant* 3, frontal triangle and relative lengths of costal sectors and thorax also exhibit differences in development in different specimens which fall within the range of variations in typical specimens of *mutata*, it is apparent that only one species is involved. Hence both are considered conspecific with *grandis* relegated to the status of a junior synonym of *mutata* Becker.

Gampsocera lutea **sp. n.** (Figs. 13-15)
urn:lsid:zoobank.org:act:DEEFBD2F-C9E7-4BBE-AFB4-25E0692C9FDC

Male: Head (Fig. 13): Higher than long, length, height and width ratio 15:18:22. Frons narrowing anteriorly, width at vertex 0.5 that of head and 0.9x its own length, projecting a little above but not beyond anterior margin of eye, finely tomentose, brownish yellow with slight dark tinge around vertex margin and with short, finely punctate white *fr*; frontal triangle brownish yellow with dark tinge, subshiny, partly finely tomentose, reaching almost two-thirds length of frons and ending with nearly pointed apex. Face much narrow, deeply concave, deeply yellowish brown; facial carina not extending beyond bases of antennae; epistomal margin dark; antennae yellow; *ant* 3, unlike in most of the other species of the genus not dorsodistally prolonged,



Figs. 13-15. *Gampsocera lutea*, sp. n. 13- head, 14- scutellum, 15- wing.

about 1.3x as wide as long; arista subterminal, only very slightly thickened at base, rather slender unlike in most species, dark brown with fine concolourous pubescence. Gena wider than in most species, yellowish brown, width in the middle about 0.6x that of *ant* 3; vibrissal corner receding, rounded, not reaching anterior margin of eye; postgena well developed, deeply brown. Eye densely pubescent with oblique to almost horizontal long axis. Palpi brownish yellow; proboscis short, nearly dark brown. Head bristles as in *khasiensis*, yellow; *orb* about 5, reclinate.

Thorax: A trifle narrower than head and 0.95x as long as wide. Scutum with punctae, white hairs, a little wider than long with gently convex partly tomentose, medially broadly black disc which is yellow at sides and along one-fourth of its length posteriorly. Humeral callus yellow

with broad dark tinge in the middle. Pleura subshiny, partly tomentose, yellowish brown with dark infuscation which is more conspicuous in the rather shiny lower part of *kepst*. Scutellum (Fig. 14) 1.35x as wide as long, nearly semicircular, almost wholly subshiny black, thinly tomentose with punctate hairs which are less dense than but concolourous with those on scutum. Thoracic bristles brown; *h* 1, 1+2 *npl*, *pa* 1, *pa* 2 and 1 *dc* as in 7

''*khasiensis*; *as* not widely separated at base, about 1.2 as long as scutellum; *ss* 1 about 0.6 x as long as *as*; distance between bases of *ss* 1 and *as* only a little more than that between the two *as*.

Wing (Fig. 15): Hyaline with brown veins; proportions of costal sectors 2-4 in the ratio 13:9:4; terminal sectors of R4+5 and M1+2 nearly parallel along almost their entire lengths but the former slightly diverging terminally as it slightly bends upwards before joining costa; *r-m* cross-vein slightly distad of middle of discal cell, opposite 0.53 of its length; anal area very slightly receding. Haltere yellowish brown.

Legs: Slender, almost wholly yellow.

Abdomen: Much longer than broad and much narrower than thorax; three basal segments dark brown medially and yellowish brown at sides, rest of the segments brownish.

Length: ♂ 2.0 mm; wing 2.2 mm

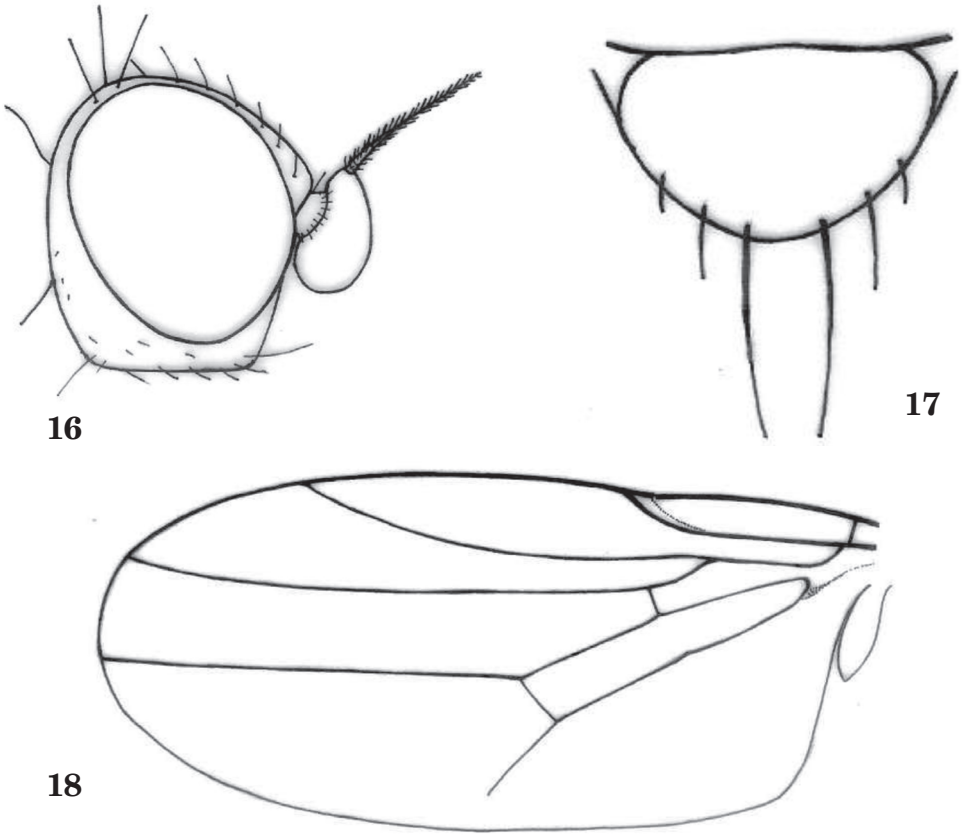
Holotype: ♂: India: Meghalaya: Shillong: Mawphlang, 1350 m, 21.iv.1980, Coll. P. T. Cherian.

Etymology: This species gets its name from its entirely yellow legs.

Remarks: *G. lutea* keys near *G. mutata* Becker but unlike in the latter it has slender, entirely yellow legs, not dorsodistally prolonged *ant* 3, slender arista and wider gena. Besides, in this species *as* are more widely separated at base than in *mutata.*

Gampsocera nongpohensis **sp. n**. (Figs. 16-18)
urn:lsid:zoobank.org:act:FC2CD921-9061-4299-83E7-B126DFC884D4

Female: *Head* (Fig. 16): Much wider than long, length, height and width ratio 7:9:12. Frons slightly narrowing anteriorly, projecting a little above but not beyond anterior margin of eye, width at vertex 0.51x that of head and nearly equal to its own length, dull brownish yellow, finely grey tomentose and with short punctate brown *fr*; frontal triangle about two-thirds as wide as frons at vertex, subshiny, partly grey tomentose, concolourous with frons except for infuscation at sides, at vertex margin and a little beyond and one-fourth its length anteriorly, reaching two-thirds length of frons and ending with broadly obtuse apex. Face narrow, deeply concave, dull yellowish brown, grey tomentose with epistomal margin projecting and gently convex in the middle; facial carina triangular between bases of antennae and hardly reaching one-third length of face. Gena brownish yellow, narrowing anteriorly, width in the middle one-



Figs. 16-18. *Gampsocera nongpohensis* sp. n. 16- head, 17- scutellum, 18- wing

fifth that of *ant* 3; vibrissal corner receding, rounded; postgena developed as in *khasiensis*, yellowish brown; *ant* 3 prolonged dorsodistally, about 2x as wide as long, brownish yellow with diffused light dark tinge; arista terminal, slender, only slightly thickened at base, brownish black with slender fairly dense well developed concolourous hairs. Eye large, densely and conspicuously pubescent, with vertical long axis. Palpi yellow; proboscis deeply brown, predominantly with dark tinge. Head bristles blackish brown; *ovt* and convergent *pvt* subequal and a little longer than *ivt*; *oc* erect, convergent, about half as long as *ivt*; *orb* 6, reclinate, anterior ones progressively becoming shorter; *if* in a row of about 6-7 along outer margin of frontal triangle, hardly longer than *fr*.

Thorax: Scutum 0.9x as long as wide, yellow with three diffused broad brownish black longitudinal bands which are not distinct anteriorly and are interrupted especially medially; sides of scutum irregularly with dark tinge; disc of scutum convex, finely tomentose, subshiny

with short pale hairs. Humeral callus yellow with dark tinge in median area. Pleura partly shiny to subshiny; *anepst* mostly and rest of the areas partly with diffused brownish black irregular maculae. Scutellum (Fig. 17) almost semicircular, yellow around laterodistal margins and sides of dorsum but median part of convex, dull, partly tomentose disc brownish black and bears a few short slender hairs which are concolourous with those on scutum. Thoracic bristles brownish black; *h* 1 shorter than *ovt*; *npl* 1+2, subequal and equal to 1 *dc* and *pa* 1; *as* a little longer than scutellum, moderately widely separated at base; *ss* 1 about half as long as *as* and *ss* 2 half as long as *ss* 1.

Wing (Fig. 18): Entirely hyaline with brown veins; proportions of costal sectors 2-4 in the ratio 3:2:1; terminal sectors of R4+5 and M1+2 almost parallel, the latter nearly straight and joining costa a little beyond apex of wing; *r-m* cross-vein nearly in middle of discal cell; anal area only very slightly receding. Haltere yellow.

Legs: Slender, yellow but for slightly infuscated one or two tarsal segments of foreleg.

Abdomen: Only slightly narrower than thorax, dull, fairly densely grey tomentose, almost wholly brownish black with brownish yellow tinge confined to distal margins of second and third segments, distal segments of abdomen with more conspicuous dark brown hairs than basal segments; ovipositor rather slender, of medium length, black with a few slender hairs.

Length: ♀ 2.1 mm; wing 2.4 mm

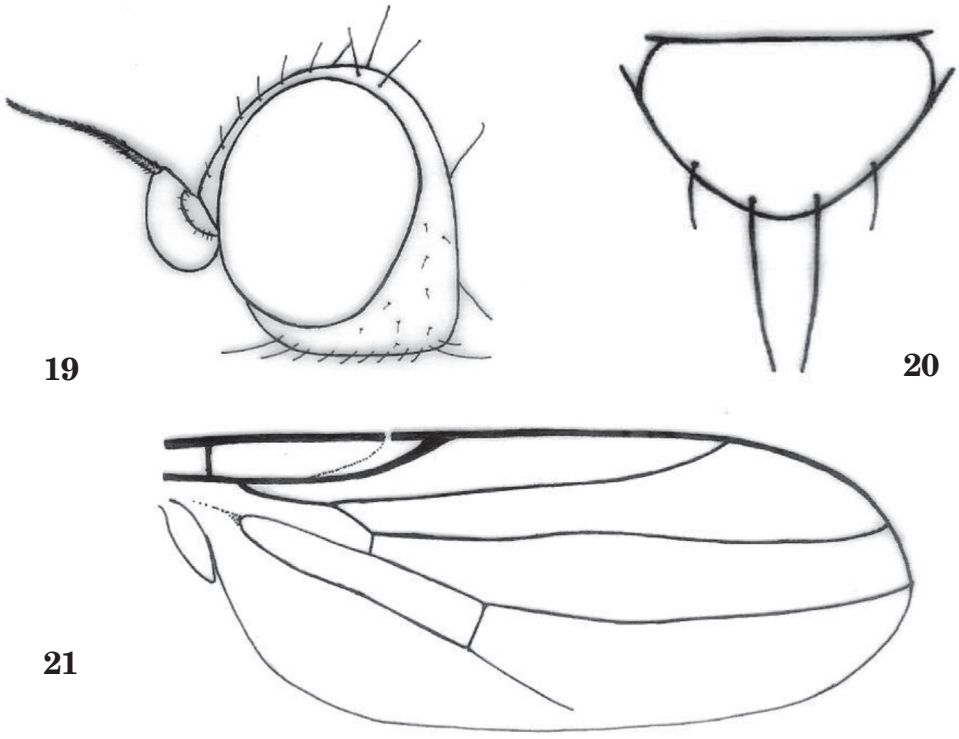
Holotype: ♀: India: Meghalaya: Nongpoh, (1760m), 54 km south of Shillong 18.iv.1980, Coll. P. T. Cherian.

Etymology: This species is named after the name of the locality of the type specimen

Remarks: *G. nongpohensis* keys near *lutea* but differs in having dorsodistally prolonged *ant* 3, narrow gena which in the middle is only one-fifth as wide as *ant* 3, brownish black scutellum and medially partly yellow scutum. Besides, in *nongpohensis as* are not widely separated at base. But in *lutea ant* 3 is not dorsodistally prolonged, gena is more than half as wide as *ant* 3, scutellum is entirely yellow, median part of scutum is partly yellow and *as* are widely separated at base.

***Gampsocera keralensis* sp. n**. (Figs. 19-21)
urn:lsid:zoobank.org:act:80A5750F-0116-4EC3-9DF6-572DA39B8CFE

Male: *Head* (Fig. 19): Much wider than long, length, height and width ratio 11:13:19. Frons dull, widening at vertex and slightly narrowing anteriorly, width at vertex at point of widening 0.55x that of head and 1.2x its own length, dark brown at vertex along area behind posterior ocelli and finely grey tomentose and yellow with diffused brown tinge in the area beyond vertex margin upto anterior margin which does not project beyond but anteriorly projects



Figs. 19-21. *Gampsocera keralensis*, sp. n. 19- head, 20- scutellum, 21- wing

above eye margin; *fr* finely punctate, pale yellow; frontal triangle clearly demarcated and partly tomentose, unlike in most species of *Gampsocera* dull and rugulose, predominantly blackish brown with one or two faint yellow patches at sides of ocellar triangle and around apex, reaching nearly three-fourths length of frons and ending with obtuse apex, anterior part around apex appearing yellow as it is covered by yellow lunule. Face rather narrow, very deeply concave, grey tomentose, yellowish brown; facial carina triangular between bases of antennae and running as a low sublinear ridge reaching nearly middle of face whence it fades off; epistomal margin raised up, dull black with convex margin. Basal antennal segments deeply brown; *ant* 3 prolonged dorsodistally, 2x as wide as long, yellow in lower half and dark brown along dorsal and distal margins and one-third of its length apically; arista rather slender, only a trifle thickened at base, dark brown with conspicuous, concolourous pubescence. Gena narrowing anteriorly, dull brown, finely grey tomentose, width in the middle about half the length of *ant* 3; vibrissal corner receding, rounded, hardly reaching anterior margin of eye; postgena more developed than in *notata*, concolourous with gena. Eye large, densely and conspicuously pubescent with vertical long axis. Palpi yellowish brown; proboscis rather short, subshiny dark brown. Head bristles brownish black, similar to those of *notata*; *orb* 6, reclinate.

Thorax : Scutum 0.9x as long as wide, subshiny, partly tomentose with gently convex disc which is predominantly black with yellow sides and with two faint submedian yellow bands running from transverse suture which widens a little posteriorly; scutal hairs slender finely punctate, yellowish white; humeral callus yellowish brown. Pleura brownish black except for deeply brown propleuron and area below and posterior to it. Scutellum (Fig. 20) nearly subtriangular, 1.4x as wide as long with convex, subshiny brownish black disc bearing a few scattered yellowish white hairs. Thoracic bristles brownish black with 1 *h*, 1+2 *npl*, 1 *dc*, *pa* 1 and a very short *pa* 2 as in *notata*; *as* not very widely separated at base, as long as scutellum; *ss* 1 about one-third as long as *as* but very slender; distance between bases of *ss* 1 and *as* more than that between the two *as*.

Wing (Fig. 21): Hyaline with deeply brown veins; proportions of costal sectors 2 to 4 in the ratio 15:10:4; *r-m* cross-vein nearly in middle of discal cell; terminal sector of R4+5 convex above submedially whence it becomes concave above before joining costa and that of M1+2 concave above basally so that first posterior cell is widened submedially whence it gradually narrows distally; M1+2 and R4+5 gradually convergent distally; basal part of subcostal, submarginal and first posterior cells with deep brown tinge; anal area moderately developed. Haltere yellow.

Legs: Long and slender; coxae brownish yellow with dark tinge; fore femur almost wholly and mid and hind-femora yellow in their basal halves and dark brown in their distal halves; fore and midtibiae yellow at around their bases and darkened distally; hindtibia but for its extreme yellow base brownish black; all tarsi, except for a little infuscated one or two distal segments of each leg, yellow.

Abdomen: Dull black, finely tomentose.

Length: ♂ 1.9 mm; wing 2.1 mm.

Holotype: ♂: India: Kerala: Ernakulum Dt., Kakkad, 31.xii.1983. Coll. P.T. Cherian.

Etymology: The species is named after Kerala, the Indian State in which it is distributed

Remarks: *G. keralensis* comes close to *divisa* Becker from Taiwan but while in the former frontal triangle is rugulose and reaches nearly three-fourths length of frons, gena is nearly half as wide as length of *ant* 3 and femora and tibiae are partly dark brown to blackish brown, in *divisa* frontal triangle is shiny and not rugulose and reaches only middle of face, gena is narrow and legs are predominantly yellow, atmost with dark bands distally on femora and hind tibia.

Gampsocera luteopilosa (Cherian) **comb. n.**

1975. *Elachiptera luteopilosa* Cherian, *Oriental Insects*, **9** (1): 14-15.Type Locality: India: West Bengal: Darjeeling.

Salient characters: Head as long as high; frontal triangle about two-thirds as wide as frons at vertex, reaching three-fourths length of frons and ending with nearly pointed apex; facial carina deeply brownish and in some specimens less developed, in specimens in which it is more distinct it is conspicuous between bases of antennae and runs as a raised ridge and fades off at two-fifths length of face; *ant* 3 angulate, 2.5x as wide as long; arista slightly thickened along one-fifth its length basally whence it becomes progressively slender; gena subshiny, densely tomentose, width in the middle one-fourth that of *ant* 3; vibrissal corner receding, reaches anterior margin of eye and ends with rounded margin; eye large, densely and conspicuously pubescent with vertical long axis; *pvt* convergent, equal to *ovt*; *oc* about half as long as *ivt* but much slender, erect and almost cruciate; *orb* 4- 5, reclinate; scutum yellowish brown with convex disc; *as* and *ss* 1 borne on small warts; proportions of costal sectors 2-4 varies from 12:8:4 to11:7:3; terminal sectors of M1+2 and R4+5 nearly parallel, the latter joining costa beyond apex of wing; M1+2 a little sinuate and slightly diverging from R4+5 terminally; legs with infuscation on coxae trochanters, femora and foretibia: abdomen much narrower than thorax; ovipositor of medium size, wholly black.

Length: ♀ 3 mm; wing 3.2 mm

Specimens studied: Holotype: ♀, India: W. Bengal: Darjeeling (Middle Bank) 23.iv.1973, Coll. H. S. Sharma.

Paratype: 1 ♀, collection data same as of holotype. Additional specimens studied: 2 ♂, 1 ♀, India: Meghalaya: Nongpoh, 18.iv.1980, Coll. P.T.Cherian.

Remarks: *G. luteopilosa* keys near *mutata* Becker but while in the former arista is only slightly thickened at base and with almost slender flagellum and scutum is black with yellow longitudinal stripes, in *mutata* arista is greatly thickened and almost sword-shaped and dorsum of scutum is medially black. Besides, in *luteopilosa* frontal triangle reaches three-fourths length of frons and ends with pointed apex and terminal sector of M1+2 is sinuate where as in *mutata* frontal triangle reaches only two-thirds length of frons and ends with obtuse apex and terminal sector of M1+2 is nearly straight.

This species originally described under *Elachiptera* comes under *Gampsocera* and hence is transferred to that genus. The original description was based on females only. 3 additional specimens, including 2 males, were collected and studied and they agree with the original description but for minor variations discussed above.

Gampsocera longicosta (Cherian) **comb. n.**

1975. *Elachiptera longicosta* Cherian, *Oriental Insects***, 9** (1): 12-13. Type locality: India: West Bengal: Darjeeling: Pande Tea Estate.

Salient characters: Female: *Head:* As long as high; frons as long as wide and half as wide as head at vertex, ferruginous yellow, with dark brown *fr*; frontal triangle reaching nearly three-fourths length of frons, glabrous, shiny brownish black; face slightly concave; facial carina low, linear, reaches two-thirds length of face whence bifurcates and ends on epistomal margin; antennae brownish yellow; *ant* 3, 1.67x as wide as long; arista brown with well developed concolourous pubescence; gena one-third as wide as *ant* 3; vibrissal corner receding; head bristles brownish black; *orb* 5; *oc* half as long as *ovt;* thorax glabrous, predominantly brownish black but part of humeral callus, area below it up to transverse suture and around 1 *dc* brownish; scutellum broadly triangular, three-fourths as long as wide; thoracic bristles brownish black; *npl* 1+2; *as* convergent, 1.25 x as long as scutellum; *ss* 1 two-thirds as long as *as;* wing hyaline but for following dark brown areas: a small irregular macula almost in middle of margin of first posterior cell bordering fourth costal sector, a larger macula in second posterior cell bordering wing margin and M1+2, a small macula almost in the middle of wing in second posterior cell touching M1+2 and a some what inconspicuous line in first posterior cell touching R4+5; costal sectors 2 to 4 in the ratio 27:10:7; r-m cross-vein in middle of discal cell; terminal sector of M1+2 strongly concave above in the middle; haltere yellow; legs yellowish brown with dark tinge in some areas; mid and hind femora broadly at outer two-thirds, hind tibia at basal two-thirds and mid tibia except at base and apex brownish black; rest of the areas of legs yellowish brown to dark brown; abdomen peach black with short hairs.

Length: ♀ 2.3 mm; wing 2.5 mm

Specimen studied:Holotype: ♀,? (genitalia evidently show some vestigial male hypopygial structures as well) India: West Bengal: Darjeeling: Pande Tea Estate, 1525 m, 23.iv.1973, Coll. H.S. Sharma.

Remarks: Detailed study of the species has revealed that it belongs to the genus *Gampsocera* and hence is transferred to the genus. It shows affinities to *poeciloptera* (Becker) from Java from which it differs mainly in its thorax being predominantly brownish black and frontal triangle reaching nearly three-fourths length of frons. More over in *longicosta* maculae on wing differ in number, position and nature from those of *poeciloptera.*

Abbreviations

anepm - anepimeron; *anepst* - anepisternum; *ant* 2 - second antennal segment; *ant* 3 - third antennal segment; *as* - apical scutellar bristle; 1 *dc* - first dorsocentral bristle; *fr* - frontal hair; *h* - humeral bristle; *if* - interfrontal bristle; *ivt*- inner vertical bristle; *kepst* - katepisternum; *npl* - notopleural bristle; *oc* - ocellar bristle; *orb* – fronto-orbital bristle; *ovt* - outer vertical bristle; *pa* - postalar bristle; *ppm* – postpronotum; *pvt* - postvertical bristle; *ss* - subapical scutellar bristle. *mg* 3- third costal segment; *mg* 4- fourth costal segment, R2+3– radius 2+3; R4+5- radius 4+5; M1+2 – median vein 1+2.

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Description of four new species of *Dipara* Walker (Hymenoptera: Pteromalidae) from India, with records of some species and a key to the Oriental species

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ABSTRACT: Four new species of *Dipara* Walker, 1833 (Hymenoptera: Pteromalidae) are described and material pertaining to six known species is recorded. The new species described are: *Dipara andamanensis* Sureshan & Raseena, sp. n., *D. angulata* Sureshan & Nikhil, sp. n., *D. kannurensis* Sureshan & Raseena, sp. n., and *D. yercaudensis* Sureshan, sp. n. Of the six species recorded, *D. gastra* (Sureshan & Narendran) is newly recorded from India. A revised key to the Oriental species of *Dipara* is also given.

KEYWORDS: Hymenoptera, Pteromalidae, *Dipara*, new species, new records, India.

INTRODUCTION

The genus *Dipara* Walker (1833) belongs to the subfamily Diparinae of Pteromalidae (Hymenoptera: Chalcidoidea) and currently contains 48 described species worldwide, with 17 species known from the Oriental Region (Sureshan, 2013; Noyes, 2014). Sureshan (2013) published the first revision of the Oriental species of *Dipara* with records of 17species from the region, including six new species described from India. Subsequent to this revision, more specimens of *Dipara* were collected from different parts of India. The present work includes the description of four new species and a new Indian record of *D.gastra* (Sureshan & Narendran). Key to the Oriental species of *Dipara* given by Sureshan (2013) is revised to accommodate the new species.

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MATERIAL AND METHODS

The specimens were collected from different parts of the country employing different collection gadgets like Sweep Net, Malaise Trap and Yellow Pan Trap, in different cases. The specimens were card mounted and studied under a stereoscopic binocular microscope (Leica M 205C) and photographs were taken with a digital camera (MC170 HD), and also illustrations were made with a Camera Lucida attached to the microscope.

The terminology used in this paper generally follows Gibson (1997).The type specimens are deposited in the National Zoological collections of Zoological Survey of India, Western Ghat Regional Centre, Calicut (ZSIK) .

The following abbreviations are used in the text:

F1–F7 = Funicular segments 1 to 7; MV = Marginal vein; OOL = Ocellocular distance; PMV = Postmarginal vein; POL = Postocellar distance; SMV = Submarginal vein; STV = Stigmal vein; T1–T5 = Gastral tergites 1–5.

RESULTS AND DISCUSSION

Dipara Walker

Dipara Walker 1833:371,373. Type species *D.petiolata* Walker by monotypy.
(For synonyms refer to Desjardins (2007) and Sureshan, 2013).

Key to the Oriental species of *Dipara* Walker (females)
(Excluding species from Oriental China)
(Modified from Sureshan, 2013).

1. Wings reduced (Brachypterous)……..……..…….....……2

– Wings fully developed (Macropterous)……..…....…… ..**10**

2. Median area of propodeum with uniform longitudinal rugae, arranged in a sub-circular form; frenum represented by a very narrow area with small rugae (Figs.10, 13); mesoscutum (almost completely) black with a characteristic 'W' shaped area yellowish brown …….....……***D. yercaudensis*** **Sureshan sp.n.**

– Propodeum without uniform longitudinal rugae as above, partly, irregularly carinated or with irregular areolae ; scutellum always with frenum broader than above; mesoscutum not coloured as above , sometimes body completely brownish black .....……..…….....**3**

3. Mesoscutum with notauli not meeting in the posterior end……..……....….**4**

– Mesoscutum with notauli meeting in the posterior end.……..…....…… ..……**8**

4. Mesoscutum blackish brown in distal two-thirds; carina of pronotal collar characteristically angulate and slightly broken in the middle (Fig.14); forewing stump long and narrow reaching beyond the tip of petiole ……***D. angulata*** **Sureshan sp.n.**

– Mesoscutum without blackish brown colour as above, sometimes body uniformly brownish black, then forewing stump long and broad, reaching beyond tip of petiole, otherwise forewing stump very short and not reaching petiole ..……..……..….**5**

5. Forewing stump 4.3× as long as broad, reaching beyond tip of petiole; petiole stout, finely reticulate, 1.6× as long as broad; propodeum with characteristic median carina, plicae and costulae (Fig.19)…….....……..…..….***D. venkati*** **Sureshan**

– Forewing stump very short and narrow not reaching or just touching base of petiole; petiole slender, longitudinally carinate, more than 1.6× as long as broad; propodeum with or without median carina, plicae and costulae not as above…….…...……**6**

6. Propodeum with baso-medial area between plicae conically elevated up to middle, surface not shiny, with longitudinal and transverse carinae and striae; wing stump extending well beyond the hind margin of scutellum, touching base of petiole and with 5 or 6 bristles …….....**7**

– Propodeum (Fig.18) with baso-medial area between plicae not conically elevated up to the middle, surface almost shiny with very weak striations; wing stump short, not reaching much beyond hind margin of scutellum and with only 2 setae……..… ……...……..….....…… .....***D. intermedia*** **Sureshan & Narendran**

7. Body length, 2.6 mm; upper face and vertex distinctly reticulate; POL equal to OOL; antenna with F6 and F7 whitish yellow as on clava; F2–F5 dark brown; wing stump with 5 bristles; hind coxae reticulate……...……***D. eukeralensis*** **Ozdikmen**

– Body length, 1.5 mm; upper face and vertex almost shiny, only weakly reticulate, POL slightly shorter than OOL; only F7 whitish yellow as on clava; F3–F6 brown; wing stump with 6 bristles; hind coxae striate reticulate ……..… .....***D. mohanae*** **Narendran & Sureshan**

8. Mesoscutum with distinct black patch covering almost posterior two-thirds; pronotum with a distinct transverse carina; forewing stump with one short and one long bristle …..……..……..……..…….....***D. thirumalaii*** **Sureshan**

– Mesoscutum with black patch on posterior half of scapulae only; pronotum with or without transverse carina; forewing stump with 3 or 4 setae……..…....……..…..**9**

9. Propodeum without a median carina; antenna with F6 partly whitish yellow as on clava; forewing stump with 4 setae; gaster swollen with T3-T6 not very short, and yellowish brown with a distinct yellow band overlapping T1 and T2. Size 1.8–1.9 mm…….. ……..…..…..……*D. gastra* **(Sureshan & Narendran)**

– Propodeum with a weak median carina in posterior third, plicae not united; antenna with F6 completely brown; forewing stump with 3 setae; gaster narrow and compressed with T3–T6 short, and almost brown with epipygium and ventral part paler. Size 1.45–1.6 mm…….....……..…*D. malabarensis* **(Narendran & Mini)**

10. Pronotal collar with separate long and stout bristles near posterior margin in addition to short pubescence …….....……..….....….**14**

– Pronotal collar without separate long and stout bristles near posterior margin in addition to short pubescence…….....……....……..……..**11**

11. Mesoscutum posteriorly with a black or bluish black patch in lower half of scapulae; petiole long 2 –2.6 × as long as broad in dorsal view……..……..…...**12**

– Mesoscutum posteriorly without black or bluish black patch in lower half of scapulae as above, sometimes black patch covering all the three lobes in posterior third; petiole short, 1.63 × as long as broad in dorsal view…….....…..……..... **13**

12. Scapulae with the bluish black patch distinct and covering almost half length in the lower half; notauli closely converging posteriorly; petiole 2 × as long as broad in dorsal view; pronotal collar carinated anteriorly……..…….. *D. debanensis* **Sureshan**

– Scapulae with the black patch small, and not sharp as above and covering only posterior third; petiole 2.6×as long as broad in dorsal view (Figs.2,20); pronotal collar not carinated anteriorly…..…….. *D. andamanensis* **Sureshan & Raseena, sp.n**.

13. Mesoscutum without any black patch or band, bristles little above centre; reticulation of body fine; antenna with F4–F6 brown (F4 partly)… *D. miniae* **Narendran & Sureshan**

– Mesoscutum with a broad black patch covering all the three lobes in posterior third, bristles in the centre; reticulation of body coarse; antenna with F4–F7 brown…….. ……..... *D. nigriscuta* **Sureshan**

14. Scrobe long , separated from front ocellus by a distance as long as the diameter of front ocellus, exceeding well over middle length of eye from toruli…...… …… ….**15**

– Scrobe shorter than above, at the most reaching mid-level of eyes from toruli……**18**

15. Petiole smooth and shiny without longitudinal carina, short, with maximum posterior width 1.13× dorsal length; frenal area of scutellum shorter than scutellar area in front; body large, length 4.5mm……..……...***D. sringericus*** **(Narendran)**

– Petiole with distinct longitudinal carina or reticulation, long, with maximum posterior width 0.7–0.9× dorsal length; frenal area almost as long as scutellar area in front; body small, length 2.1–2.7mm.…….....……..…….....…**16**

16. Petiole long, 1.7× as long as broad in dorsal view, almost half length of hind coxa, dorsally mostly reticulate and with carinae only in hind part (Fig.17); face without metallic blue reflection. (Size 2.7mm)…..…….....…..…… ***D. nigra*** **Sureshan**

– Petiole short, 1.2–1.4× as long as broad in dorsal view, without reticulation, only longitudinally carinate, carinae sometimes weak medially; face with distinct metallic blue reflection.……...….....……....……....**17**

17. Petiole short, 1.2× as long as broad in dorsal view, and with a pair of setae very close to anterior margin; pronotal collar with a row of four strong setae near posterior margin; bristles on the mid lobe of mesoscutum little below middle; fore wing almost hyaline ……...….....……***D. hayati*** **Sureshan**

– Petiole long, 1.4× as long as broad in dorsal view, and with a pair of setae almost in the middle (Fig.16); pronotal collar with a row of four strong setae near posterior margin; bristles on the mid lobe of mesoscutum little above middle; fore wing smoky…….....***D. kannurensis*** **Sureshan & Raseena,sp.n.**

18. Forewing with three infumate patches; petiole a little longer than half length of hind coxa; axillae and pronotum pink; head mostly brownish pink with vertex and occiput darker ……..……...……***D. bouceki*** **(Narendran)**

– Forewing without infumations, hyaline; petiole one-third as long as hind coxa; axillae, pronotum and head black…….....……..***D. keralensis*** **(Narendran)**

Species descriptions

1. *Dipara andamanensis* Sureshan & Raseena, sp. n. (Figs. 1-3 & 20)

urn:lsid:zoobank.org:act:828B4512-5A5E-4B5B-B93D-D31E8A564309

Holotype: ♀: Length 1.75mm. Body yellowish brown, face with two transverse brown bands, one below the lower margin of eye, second at the level of toruli; eyes and ocelli silvery , eyes with a large central black patch, ocellar area brownish black . Antennae testaceous except F5,

F6, F7 and basal part of clava brown. Mesoscutum with black spot on lower part of scapulae, propodeum more brownish laterally. Forewing with three transverse brown bands, one below parastigma, one at the basal part of MV and the other below STV covering major distal part of wing; bristles of body and wings brownish black. Fore and hind coxae and basal half of hind femora white, remainder of legs testaceous. Gaster honey brown, epipygium yellow.

Head: (Figs. 1,3) Moderately reticulate with small sparse white pubescence, in front view 1.14× as wide as long, malar grooves fine but distinct; eyes 1.33× as long as broad(in profile); scrobe deep reaching half-length of eyes, inter-antennal and parascrobal areas slightly raised; toruli separated by 1.5× their individual diameter; malar space almost 0.59× eye length (in profile). Head 2.08× as broad as long in dorsal view, POL almost as long as OOL, vertex broad with three pairs of bristles partly black. Antennae inserted below middle of face and above level of lower margin of eyes, scape as long as eye with a strong bristle on the tip, pedicel plus flagellum 1.58× width of head, all funicular segments with single row of long sensillae, pedicel 2× as long as broad, F1–F3 almost equal, F4-F7 slightly shorter and almost equal, clava as long as three preceding segments combined.

Mesosoma: (Fig.2) Pronotal collar moderately reticulate, not carinate anteriorly, pubescence white and sparse, visible in posterior margin only. Mesoscutum 1.46× as broad as long, moderately reticulate, a pair of black bristles on middle of mid lobe and another black bristle on either side on posterior corner of scapulae; notauli not converging towards posterior end. Scutellum medially 0.84× as long as mesoscutum, with two pairs of setae, first pair in anterior part and second pair on the frenal line, area in front of frenum raised reticulate as on mesoscutum, frenal area 0.87× as long as rest of area , shiny on the middle, longitudinally carinate laterally. Dorsellum shiny. Propodeum (Fig.20) medially 0.75 as long as scutellum, without median carina, broad median triangular smooth area reaches almost up to base of nucha, remaining areas of medial part irregularly carinate, plicae complete; spiracles small, round, separated from posterior margin metanotum by 2× of its diameter. Prepectus smooth and broad. Mesopleuron shiny except mesepisternum with broad areolae; metanotum shiny. Forewing 3.42× as long as broad, SMV with five long bristles (including two on parastigma), MV with two rows of bristles, marginal fringe long, speculum small, closed below, basal hairline with a tuft of strong setae below parastigmal vein , brown bands of wing represented by strong dark setae. Relative lengths, SMV 4.3, MV 4, PMV 1.5, ST 0.6

Metasoma: Petiole (Fig.20) 2.61× as long as wide in dorsal view, longitudinally carinate with a pair of white setae laterally in the basal 1/3 length, 0.21× as long as rest of gaster; T1 largest, T2-T4 almost of same length, posterior margin of tergites straight, gaster 2.78× as long as broad in dorsal view (without petiole).

*Material examined***:** Holotype, female, INDIA: Andaman and Nicobar Islands, Little Andaman, Harminder Bay, 30.i.2013, Coll. P.M.Sureshan (ZSIK, Reg. No. ZSI/WGRC/IR/ INV/ 4079).

*Etymology***:** The species derives its name from the type locality.

Remarks: *Dipara andamanensis* resembles *D. debanensis* Sureshan (2013) in general morphology but differs from it in having antennae not very slender, mesoscutum with the black patch on side lobes small and not very distinct, notauli not much converging posteriorly, prontoal collar not carinate anteriorly, gastral petiole not reticulate and with a pair of white setae anteriorly, forewing with discal pubescence distinct in the form of setae on brown patches, and marginal fringe long (in *debanensis,* antennae very slender, black patch of side lobes of mesoscutum broad and distinct, notauli very closely converging towards posterior end, prontoal collar margined in the middle, gastral petiole striate reticulate with two pairs of white setae anteriorly and forewing with discal pubescence less distinct, and marginal fringe small.)

2. *Dipara angulata* Sureshan & Nikhil, sp. n. (Figs. 4-6 & 14,15)

urn:lsid:zoobank.org:act:AA07E753-AAD9-4404-8FB9-049D898734BE

Holotype: ♀ : Length 3.24 mm (with ovipositor), 2.87mm (without ovipositor). Body honey brown, ocellar area black. Antennae with scape, anelli, basal part of F1 testaceous, pedicel except tip and F2-F6 brownish black, F7 and clava yellowish white. Forewing stumps pale brown with a dark brown spot at tip. Fore and hind coxae white, middle coxae brown, remainder of legs testaceous. Gaster blackish brown, ovipositor and epipygium testaceous;

Head: (Fig.4,6) Mostly engraved reticulate, shiny on upper face, hind part of vertex and occipital area closely reticulate, pubescence present on lower face. In front view head width 16× height, clypeus smooth, anterior margin sub truncate, clypeal and inter-antennal area raised; scrobe deep, reaching little above middle of eyes, with transverse reticulation; malar groove less distinct, malar space 0.71× eye length, eye 0.84× as long as broad in profile. In dorsal view head width 2.1× length, POL 0.88× OOL. Antennae inserted along lower margin of eyes, toruli separated by individual diameter; scape with a strong bristle at tip, length equal to eye length and 2.4× as long as pedicel, pedicel plus flagellum 1.42× width of head, anelli strongly transverse, pedicel 2.8× as long as broad and 1.5× F1, funicular segments longer than broad, with one row of long sensillae, clava as long as 3 preceding segments combined.

Mesosoma: (Fig.5) Pronotal neck finely reticulate, collar narrow, shiny, anteriorly carinate, carina angularly produced in the centre and slightly broken, collar dorsally 1.84× as broad as long. Mesoscutum moderately reticulate except anterior and median portions shiny, almost completely brownish black in the posterior 2/3 portion, bristles in the median lobe above middle, notauli converging posteirorly , not distinct in the hind part, mesoscutum 1.5× as broad as long and 1.69× as long as pronotum medially. Scutellum 1.14× as broad as long in dorsal view and 0.62× mesoscutum medially with two pairs of bristles, one pair above the middle and second pair on the frenal line, frenum partly smooth with longitudinal rugae, area in front of frenum moderately reticulate, frenal area 0.6× as long as rest of the area, posterior margin of scutellum angulate. Dorsellum shiny. Propodeum (Fig.15) medially almost as long as scutellum , smooth without median carina, anterior triangular smooth area reaching almost upto base of nucha, plicae complete, propodeum mostly shiny except for the irregular rugae

in the median area spiracle small, round separated 3× of its diameter from hind margin of metanotum, callus smooth and less hairy, nucha distinct. Hind coxae with uniform transverse carina. Prepectus broad and shiny. Mesopleuron shiny except mesepimeron with transverse rugae; metapleuron shiny. Forewing stumps reaching beyond tip of petiole with 7 bristles.

Metasoma: Gaster (Figs.5,15) long and slender, 3.4× as long as broad in dorsal view, petiole with longitudinal rugae and reticulate, with a pair of brown setae above middle in the anterior part, petiole 1.2× as long as broad, 0.07× as long as gaster and 0.23× as long as T1; gaster including petiole 1.69× as head plus mesosoma combined (without ovipositor), T1 largest, 2.7× as long as T2 medially , T2 1.12× as long as T3, posterior margin of tergites straight.

Material examined: Holotype, ♀, INDIA: Kerala, Idukki, Eravikulam National Park, Chinnanamudi, 20.ix.2014, Coll: P.M. Sureshan. (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4080).

*Etymology***:** The species derives its name from the angulate nature of pronotal carina.

Remarks: Among the brachypterous species, this species is unique in having uniform brownish black colour in the distal 2/3 portion of mesoscutum and nautili not meeting posteriorly which is a unique combination of characters not found in similar species. It resembles *D.thirumalai* Sureshan (2013) in general morphology, but *D. thirumalai* differs from it in having notauli meeting in the posterior end, petiole with tuft of setae anteriorly, propodeum with different sculpture and forewing stump very short. It also resembles *D. venkati* Sureshan (2013) in having long wing stumps reaching beyond the tip of petiole, but *D.venkati* has a different propodeum, uniformly black body, different gaster and antenna. In having forewing stump long and pronotum with a distinct transverse carina it also resembles *D. albomaculata* Hedqvist (1963) but *D. albomacualta* has a short gaster, different propodeum and antenna.

3. Dipara kannurensis Sureshan & Raseena, sp.n. (Figs.7-9,16)

urn:lsid:zoobank.org:act:37E6B97F-6120-4B18-B48C-965721245501

Holotype: ♀: Length 2.1mm. Black. Face and vertex with metallic bluish green and golden reflection, eyes chocolate brown, ocelli brown; antennae brownish black except basal 2/3 portion of scape, F7 and clava yellowish white. Anterior lateral corners of pronotum brown,mesoscutum and scutellum dorsally with slight metallic tinge.Tegulae brown, wings uniformly smoky, veins brown. Legs testaceous except fore and mid coxae and basal half of hind coxae brown.

Head: (7, 9) In front view width 1.18× length, lower face and gena finely reticulate, face above toruli up to front ocellus coarsely reticulate; malar groove distinct, inter-antennal area raised with a median ridge; gena partly shiny; malar space 0.4× eye length (in profile); clypeus shiny, projecting, front margin convex; a transverse curved ridge below toruli reaching almost up to eye margin on either side; scrobe deep, separated from median ocellus by its diameter, transversely striate. In dorsal view head width 2.4× length; POL 1.37× OOL, vertex closely and

distinctly reticulate, occipital area transversely reticulate. Antennae inserted slightly above lower margin of eye, scape 0.92× as long as eye, pedicellus plus flagellum 1.33× as long as head width, anelli transverse, pedicellus 2.2× as long as broad, 1.11× as long as F1; F2 slightly shorter than F1. Relative lengths of F1 0.9, F2 0.8, F3 0.7, F4 0.65, F5 0.7, F6 0.65, F7 0.6, clava 1.8.

Mesosoma: (Fig.8) Pronotal collar narrow, anteriorly not carinate, almost shiny, neck region transversely reticulate, posterior margin of collar with two strong setae in the middle apart from white pubescence. Mesoscutum 1.94× as broad as long, moderately reticulate with dense white pubescence, setae on mid lobe located just above the center, notauli meeting together subapically, joined by a transverse groove; scapulae with a stout setae near distal margin on either side; axillae moderately and closely reticulate with long and stout hairs. Scutellum distinctly shorter than mesoscutum (0.64×) with a pair of stout setae near trans-scutellar suture and another on frenal line, area anterior to frenum reticulate, frenal area longitudinally carinate, almost as long as area anterior to it. Propodeum (Figs.8,16) with distinct median carina bifurcate in the form of 'V' anteriorly, rest of the median area with large areolae formed by thick irregular carinae , nucha distinct and shiny, plicae complete , spiracle oval, callus shiny with long white hairs. Prepectus shiny, longer than tegula. Upper mesepimeron with irregular transverse carinae, lower mesepimeron transversely carinate; metapleuron and mesepisternum shiny. Hind coxae with strong transverse carinae dorsally; hind tibia with two unequal spurs. Forewing length 2.8× width, speculum narrow, closed below, basal cell hairy, discal pubescence dense , costal cell with a single row of hairs, marginal fringe moderate. Relative lengths of SMV 4.1, MV 3.5, PMV 2.5, STV 1.4.

Metasoma: Gaster (Figs.8, 16) including petiole 1.05 × as long as head plus mesosoma combined, petiole 1.5× as long as broad in dorsal view and 0.37 as long as length of T1, 0.41× as long as the length of hind coxa laterally, posteriorly little wider, distinctly carinate except on dorso-medial area shiny with a pair of white setae almost at the middle.

*Material examined***:** Holotype, female, INDIA: Kerala, Kannur, Kolassery, 08.vi.2014, Coll. Anjana. (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4078).

Paratype: One ♀, Kerala, Calicut, Chalappuram, 29.iv.2013, Coll. Shweta. (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4082).

*Etymology***:** The species derives its name from the name of the type locality, Kannur.

*Remarks***:** *Dipara kannurensis* closely resembles *Dipara hayati* (Sureshan, 2013) in general morphology, but differs from it in having pronotal collar with two strong setae medially apart from white pubescence, bristles on mid lobe of mesoscutum located just above the centre, scutellum with frenal area broad, almost as long as rest of area in front and partly shiny ; propodeum with areolae larger, formed by thick carinae; forewing smoky; gaster including petiole as long as head plus mesosoma combined and petiole with pair of setae almost in the

centre (in *hayati* pronotal collar with a row of four strong setae near posterior margin besides general pubescence, setae on mid lobe of mesoscutum located little below middle, frenal area of scutellum shorter than (0.8×) rest of the area with distinct longitudinal ridges ; propodeum with areolae in the median area not strong and formed by thin carinae; gaster including petiole little longer than head plus mesosoma combined , petiole distinctly ridged with pair of setae very close to anterior margin; forewing less smoky, almost hyaline)

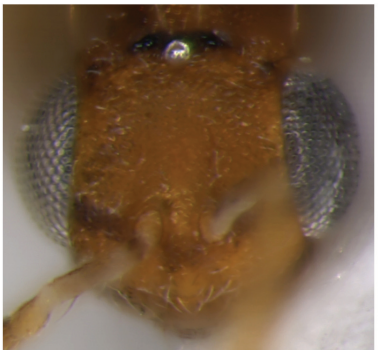
4. *Dipara yercaudensis* Sureshan, sp. n. (Figs. 10-13)

urn:lsid:zoobank.org:act:ACEB4BB9-6A64-43E5-ABC9-4DB928B5CC02

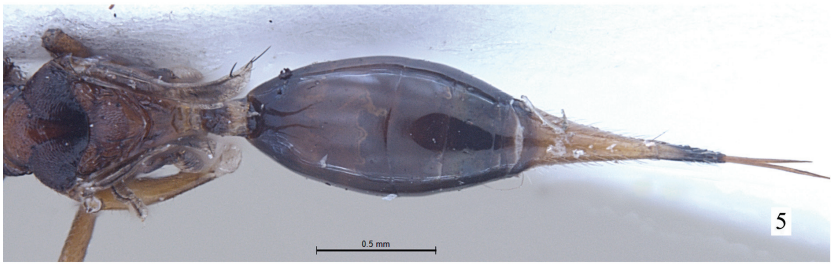
Holotype: ♀: Length 2.3mm. Body honey brown except mesoscutum (almost completely), and scutellum (completely) black. Tinge, eyes and ocelli silvery white. Antennae with scape pale brown except upper half whitish and distal tip blackish, pedicel black, F1, F2 and F6 testaceous, F3 yellowish brown, F4 and F5 brownish black, F7 and clava whitish yellow; Forewing stump dark brown. Legs honey brown except hind coxae, basal part of hind femora and base of tibiae white. Gaster mostly brownish black with basal half of epipygium testaceous; T1 dorsally with violaceous tinge.

Head: (10,12) In front view width 1.4× length, uniformly moderate reticulate, genae partly shiny, malar groves distinct, malar space 0.41× eye length (in profile) ;eye length 1.8× width in profile; clypeus smooth , little raised , anterior margin sub truncate. In dorsal view head width 1.96× length, POL 1.75× OOL. Antennae inserted at the lower ocular line, scape 0.64× as long as eye, pedicellus plus flagellum 1.1× as long as head width, anelli transverse, pedicel 2× as long as broad and 1.4× as long as F1. All funicular segments with one row of long sensillae, clava as long as three preceding segments combined. Relative lengths of antennal segments:F1 1.1, F2 1.15, F3 1, F4 0.85, F5 0.95, F6 0.85, F7 0.95, clava 2.4.

Mesosoma: Pronotum (Fig.11) moderately reticulate, collar broad with a row of stout setae near posterior margin in addition to the uniform short pubescence, carinate anteriorly with a smooth strip on the posterior margin merging with the smooth strip on anterior margin of mesoscutum. Mesoscutum 2.5× as broad as long, moderately reticulate with uniform white pubescence, seate on mid lobe located below middle, one seta on lower corner of scapulae on either side, notauli not meeting posteriorly, Scutellum medially 0.43× length of mesoscutum, frenum very narrow represented by a line of short rugae, posterior rim not visible, a pair of stout setae at the middle and another pair on frenal line. Propodeum (Figs.13) with distinct median carina, connected to small "V" shaped carina anteriorly, remaining areas uniformly with strong longitudinal rugae, in a sub circular form, plicae complete, spiracle small, round, separated from hind margin of metanotum by 4.6× its diameter, nucha distinct, callus less hairy. Mesopleuron transversely carinated except shiny in the middle; metapleuron shiny. Prepectus shiny, longer than tegula. Hind coxae with strong transverse rugae in the upper half, hind tibia with two unequal spurs. Forewing stump 4.5× as long as broad with 6 long bristles on the total length of vein.



Figs.1-3. *Dipara andamanensis* Sureshan & Raseena sp.n. Female, 1, body profile view; 2, meososma and metasoma dorsal view; 3, head front view

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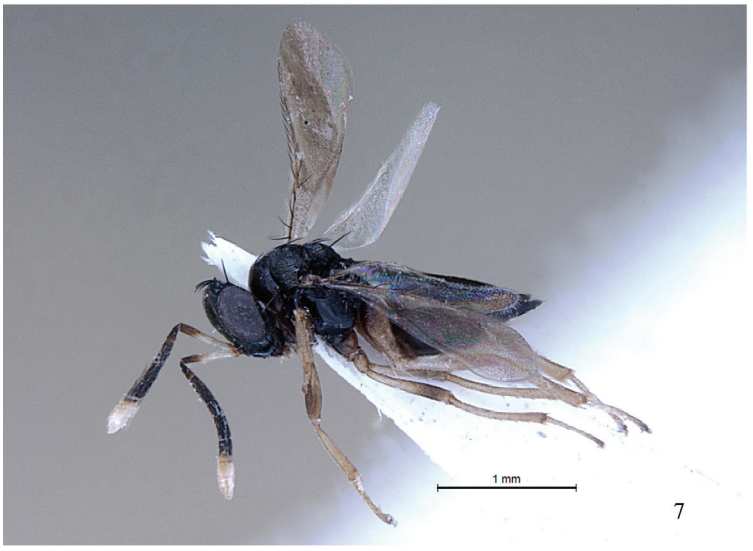
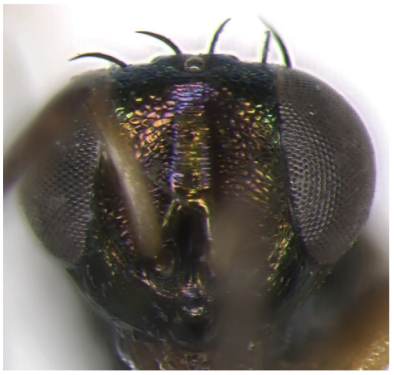
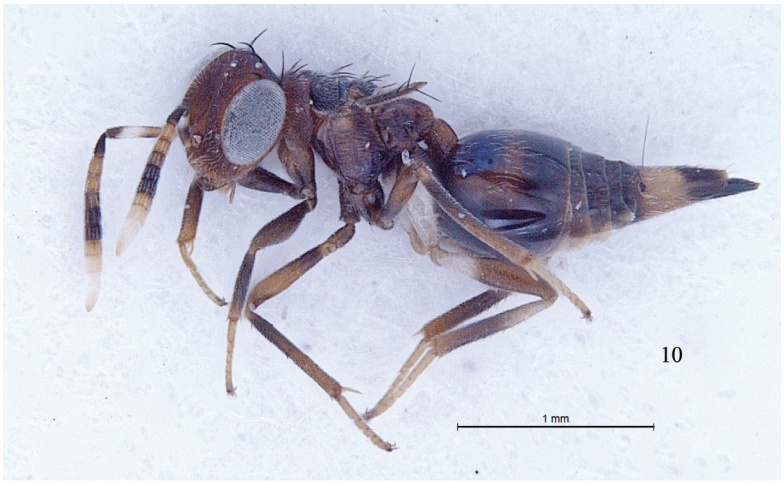
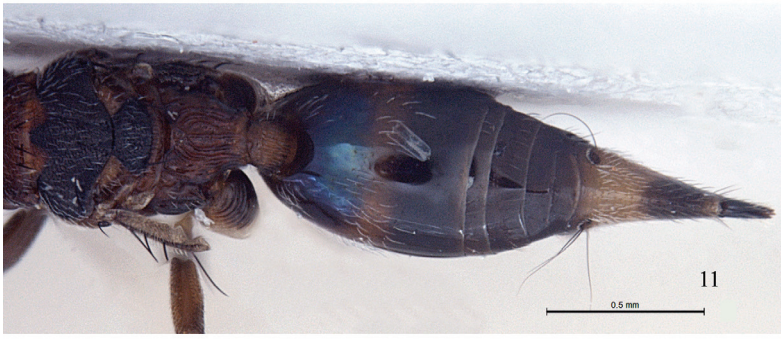
Figs. 4-6. ***Dipara angulata*** **Sureshan& Nikhil sp.n. Female, 4, body profile view; 5, meososma and metasoma dorsal view; 6, head front view**





Figs. 7-9. ***Dipara kannurensis*** **Sureshan & Raseena sp.n. Female, 7, body profile view; 8,meososma and metasoma dorsal view; 9, head front view**



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Figs. 10-12. ***Dipara yercaudensis*** **Sureshan sp.n. Female: 10. body profile view; 11. mesosoma and metasoma dorsal view; 12, head front view**

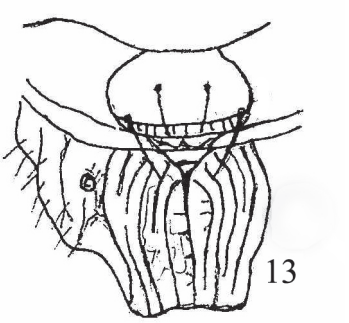
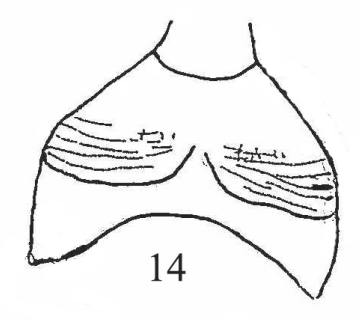
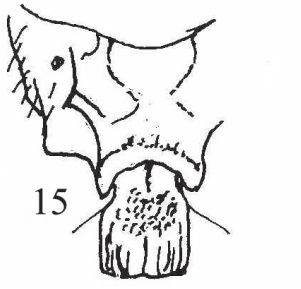
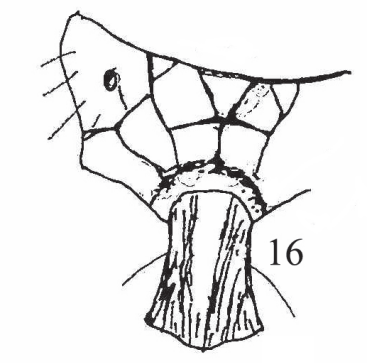


Fig. 13. ***D.yercaudensis*** **scutellum and propodeum dorsal view**

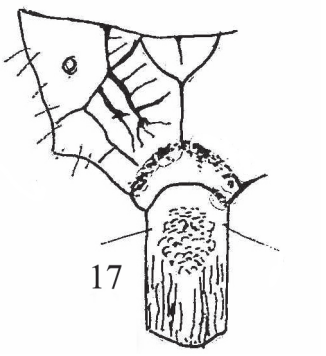




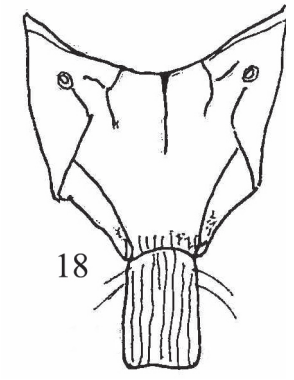
14-15. ***D.angulata*** **14, pronotum dorsal view; 15, propodeum and petiole dorsal view**



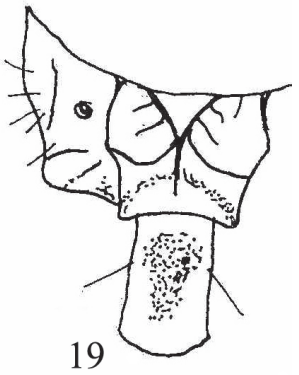
16, ***D.kannurensis*** **propodeum and petiole dorsal view**



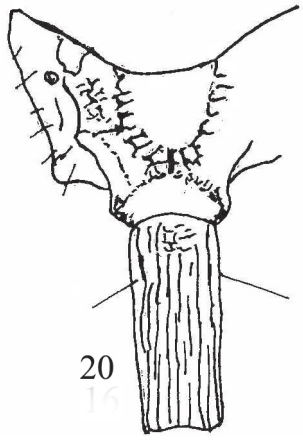
17, ***D.nigra*** **Sureshan, propodeum and petiole dorsal view**



18, *D.intermedia* Sureshan & Narendran, propodeum and petiole dorsal view



19, *D.venkati* Sureshan, propodeum and petiole dorsal view



20, *D. andamanensis* propodeum and petiole dorsal view

Metasoma: Gaster(Fig.11) including petiole 1.18× as long as head plus mesosoma combined, petiole 0.21× as long as dorsal length of T1 and 1.07× as long as broad in dorsal view, longitudinally carinate with 2 pairs of setae near the base,T1 longest, reaching 0.4× length of gaster with tuft of white hairs up to to ¾ length. T1 length 9.14×T2, posterior margin of tergites straight.

Material examined: Holotype: ♀, INDIA: Tamil Nadu, Yercaud, 23.vii.2014, coll. P.M.Sureshan. (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4081).

Paratype: one female, INDIA: Kerala, Calicut, East hill, Krishna Menon Museum campus, 3.x.2014, coll. Gnana Kumar. (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4083).

Etymology: The species derives its name from the type locality, Yercaud (Tamil Nadu).

Remarks: This species is unique among the other Oriental species in having propodeum with uniform longitudinal rugae arranged in a sub-cricular form, mesosocutm (except at anterior "W" shaped yellow area) almost black and scutellum with a very narrow frenum. In having similar propodeum, longitudinally striated pleurae, and a short petiole it resembles the palearctic species *D.striata* (Hedqvist, 1969). However, it differs from *striata* in having gastral petiole uniformly and longitudinally carinate and without a swelling in the middle, T1 long reaching 0.4× length of gaster and scutellum not elevated and with a very narrow freunm (In *striata,* gastral petiole with a swelling in the middle and finely punctured, gaster with T1 short, not reaching 0.4x length of gaster and scutellum elevated and with a broad frenum).

Records of species

1. *Dipara debanensis* Sureshan

Dipara debanensis Sureshan, 2013: 80, female. India: Arunachal Pradesh, Namdapha National Park (ZSIK, examined)

Material examined: 1 ♀, India: Arunachal Pradesh, Pasighat, 7.v.2014, coll. P.M.Sureshan (ZSIK, Reg.no. ZSI/WGRC/IR/INV/4075) .

Distribution: India: Arunachal Pradesh.

2.*Dipara eukeralensis* Ozdikmen

Dipara keralensis Narendran & Sureshan, 2001: 452, female. India, Kerala, Parambikulam (ZSIK, examined) Pre-occupied by *Dipara keralensis* (Narendran, in Narendran et al., 2000).

Dipara eukeralensis Ozdikmen, 2011: 843. Replacement name for *D. keralensis* Narendran & Sureshan, 2001. Sureshan, 2013: 85.

Material examined: 1 ♀, India: Kerala, Calicut Medical College campus, 18.ix.2013, coll. Swetha (ZSIK, Reg.No. ZSI/WGRC/IR/INV/3998).

Distribution: India: Kerala.

3. *Dipara gastra* (Sureshan & Narendran)

Grahamisia gastra Sureshan & Narendran, 2004:1616, female. Sri Lanka, Candy dist. (UCDC, examined).

Dipara gastra (Sureshan & Narendran): Desjardins, 2007: 52. Sureshan, 2013: 87.

Material examined: 3 females, India: Kerala, Calicut, Mayanad, 7.i.2014, coll. Shweta (ZSIK, Reg. No. ZSI/WGRC/IR/INV/3996); 1 female, Kerala, Calicut Medical College, campus, 18.ix.2013,

coll. Shweta (ZSIK, Reg. No. ZSI/WGRC/IR/INV/3997); 1 female, Kerala, Calicut, Kakayem, 1.iv.2014, coll. Shweta (ZSIK, Reg. No. ZSI/WGRC/IR/INV/3999).

Distribution: India (**Present record**); Sri Lanka.

4. *Dipara hayati* Sureshan

Dipara hayati Sureshan, 2013: 81, female. India, Kerala, Chittur (ZSIK, examined).

Material examined: 1 ♀, India: Kerala, Palghat, Varadimala, 22.ii.2012, coll. P.M. Sureshan (ZSIK, Reg.No. ZSI/WGRC/IR/INV/4077); 1 female, Kerala, Idukki, Mannavanshola National Park, 17.ix.2014, coll. P.M. Sureshan (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4073)

Distribution: India: Arunachal Pradesh, Kerala (**Present record**)

5. *Dipara malabarensis* (Narendran & Mini)

Grahamisia malabarensis Narendran& Mini, 2000: 371, female. India, Kerala, Calicut University Campus (ZSIK, examined).

Dipara malabarensis (Narendran & Mini): Desjardins, 2007: 53. Sureshan, 2013: 85.

Material examined: 1 ♀, India: Tamil Nadu, Dindigul, Shembaganur, 2.iv.2014, Coll. P.M.Sureshan (ZSIK, Reg. No. ZSI/WGRC/IR/INV/4074).

Distribution:India: Kerala, Tamil Nadu (**Present record**).

6. *Dipara nigriscuta* Sureshan

Dipara nigriscuta Sureshan, 2013: 78, female. India, Arunachal Pradesh, Namdapha National Park (ZSIK, examined)

Material examined: 1 ♀, India: Kerala, Kannur, Paithalmala, 8.i.2013, coll. Sureshan (ZSIK, Reg.no. ZSI/WGRC/IR/INV/4076)

Distribution: India: Arunachal Pradesh, Kerala (**Present record**).

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New record of *Apsilops scotinus* (Tosquinet) (Hymenoptera: Ichneumonidae: Cryptinae) from India

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ABSTRACT: Incidence of a species of *Apsilops* was noted as a parasitioid of rice case worm *Parapoynx stagnalis* (Zeller), in Pattambi, Kerala, India, in large numbers. It was a larval-pupal parasitoid attacking 4th to 5th instar larvae. This species has been identified as *A. scotinus* (Tosquinet) and is new record from India.

KEY WORDS: Rice case worm, *Parapoynx stagnalis,* Parasitioid, *Apsilops scotinus*

Apsilops Förster is a small genus of the subfamily Cryptinae with eight known species. The species are known from North America, Europe, and Asia (Indonesia and Japan). Available reports indicate species of this genus parasitize aquatic or semi aquatic moths of the families Crambidae and Noctuidae (Yoshida et al., 2011). From India, undetermined species of *Apsilops* have been reported as larval parasitoids of rice yellow stem borer, *Scirpophaga incertulas* (Walker) and rice caseworm, *Parapoynx stagnalis* (Zeller), both belonging to Crambidae (Rao et al., 1968, 1969).

Sinu et al. (2007) reported a species of Cryptinae identified as nr. *Litochila* as a pupal parasitoid of rice caseworm and studied its host searching behavior and reported its ovipositing under the water. Yoshida et al. (2011) surmised that this is probably a species of *Apsilops* based on this behavior.

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We came across a species of *Apsilops* parasitizing the larvae of *P. stagnalis* in Pattambi, Kerala, India, in large numbers. Incidence was observed in August 2014 as larval-pupal parasitoid attacking 4th to 5th instar larvae and adults emerged from the pupal stage of the host. Out of a total of 70 larvae sampled during August 2014, nearly 32 were found to be parasitized (45.7%). This species was identified based on key given by Yoshida et al. (2011) as *A. scotinus.*

Fig. 1. *Apsilops scotinus*, new record

Until now, *A. scotinus* has been known only from Indonesia (Java, Sumatra) (Yu et al., 2014) and thus is new record of *A. scotinus* from India.

When the second author examined unidentified material of Ichneumonidae collected by the Commonwealth Institute of Biological Control – Indian Station, Bangalore, additional specimens of *Apsilops* from West Bengal were located and these were also found to be conspecific with *A. scotinus* (Rao et al., 1968) recorded *Apsilops* sp. on the larvae of rice yellow stem borer from Lucknow, Uttar Pradesh. It is likely that the parasitoid is widely distributed in India.

Material examined: INDIA: Kerala: Pattambi, 2014, Ex. rice caseworm, K. Karthikeyan, 4 males, 4 females (NBAIR).

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